PB89-206379

Superfund Record of Decision (EPA Region 3): Bendix Superfund Site Bridgewater Township, South Montrose, Susquehanna County Pennsylvania (First Remedial Action) September 1988

(U.S.) Environmental Protection Agency, Washington, DC

30 Sep 88

U.S. Department of Commerce
National Technical Information Service

United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R03-88/059
September 1988

PB89-206379

EPA

Superfund Record of Decision:

Bendix Flight System, PA

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U.S. DEPARTMENT OF COMMERCE
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SPRINGFIELD, VA. 22161

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First Remedial Action - Final

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401 M Street, S.W.
Washington, D.C. 20460

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14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Bendix site is an aircraft instruments manufacturing plant located near the Village of South Montrose, Bridgewater Township, Susquehanna County, Pennsylvania. The 60-acre site is situated in a sparsely populated area (approximately 500 people) atop a topographic divide between the Meshoppen Creek and Wyalusing Creek watersheds. Natural ground water discharge areas exist east of the site in a wetlands area of Meshoppen Creek, and west of the site at the headwaters of Wyalusing Creek. South Montrose is solely dependent on private ground water wells for water. The Bendix Corporation (Bendix) acquired the parcels of land comprising the site in 1951 and 1952, and was acquired by Allied Corporation (Allied) in 1983, and finally merged into Allied in 1985; Allied is the current owner of the property. From 1952 to 1958 industrial solvent wastes were disposed of in a lagoon northeast of the plant, and for several years similar wastes also were disposed of in a series of onsite small trenches east of the plant. In addition, from the early 1950s until 1978, an earthen disposal pit installed by Bendix was used for the disposal of water-soluble cutting oil and oil-contaminated water from air compressors. The basin was drained of free liquids, backfilled, and seeded in late 1978. Investigations performed by Bendix from 1984 through 1987 indicated that as a result of past disposal practices, contamination from subsurface
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision
Bendix, PA
First Remedial Action - Final
Contaminated Media: gw, soil
Key Contaminants: VOCs (TCE)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement

19. Security Class (This Report) None

20. Security Class (This Page) None

21. No. of Pages 104

22. Price

(See ANSI-Z39.18)

See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

con't from pg i

16. ABSTRACT (continued)

soil has been leaching into the underlying ground water. Five source areas of contamination have been identified at the site: a TCE storage tank area, the pet/trench area, an old landfill area, the area of a former solvent evaporation facility, and a former drum storage area behind the plant building. Bendix is currently supplying carbon filter units to users of affected wells. The primary contaminants of concern affecting the ground water and soil are VOCs including TCE.

The selected remedial action for this site are includes: soil vacuum extraction and soil aeration; onsite ground water pump and treatment with air stripping; and treatment of offsite ground water contamination through carbon adsorption at the well heads. The estimated present worth cost for this remedial action is $4,487,000 with annual O&M costs of $542,000.

ATTENTION

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DIRECT QUESTIONS RESULTING FROM ILLEGIBILITY TO:

U.S. EPA
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DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Bendix Superfund Site
Bridgewater Township, South Montrose, Susquehanna County, Pennsylvania

Statement of Purpose

This decision document represents the selected remedial action for this site developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), 42 U.S.C. Section 9601 et seq., and to the extent practicable, the National Contingency Plan, 40 C.F.R. Part 300.

Statement of Basis

This decision is based upon and documented in the contents of the Administrative Record. The attached index identifies the items which comprise the Administrative Record. The Commonwealth of Pennsylvania has reviewed, commented and concurred on this Record of Decision.

Description of the Selected Remedy

The selected remedy includes the use of two innovative technologies which are to be applied to the soil contamination. These technologies are soil vacuum extraction and soil aeration. In addition, groundwater will be pumped and treated on-site; and off-site groundwater contamination will be treated at each residential well head prior to human consumption and use. These selected site remedies ensure compliance with all ARARs and will be consistent, to the extent practicable, with those specified herein.

Declaration

The selected remedy is protective of human health and environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective as set forth in Section 121(d) of CERCLA, 42 U.S.C. Section 9621(d), and Section 300.6 of the NCP. This remedy satisfies the statutory preference as set forth in Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b), for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on-site, a review will be conducted within five years after commencement of remedial action to ensure that this remedy continues to provide adequate protection of human health and the environment.

9-30-88
Date

Stanley L. Laskowski (3RA00)
Acting Regional Administrator

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for

Decision Summary

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I. Introduction

Bendix Flight Systems Division of the Allied-Signal Corporation manufactures aircraft instruments on a 60-acre site in Bridgewater Township, Susquehanna County, Pennsylvania. From 1952 to 1978, solvent wastes were dumped for disposal onto the ground within the plant boundaries. From 1984 through 1987, Bendix performed various investigations and studies regarding the site contamination and concluded that as a result of the company's past disposal practices both soil and groundwater contamination had occurred. On-site soils contain significant levels of several volatile organic solvents which have leached into the groundwater and contaminated several off-site residential wells. Initially, Bendix provided bottled water to these residents and has subsequently installed carbon filter adsorption units on each affected well. Bendix signed a Consent Order with PADER in December 1987, which requires Bendix to: continue supplying carbon filter units to all those affected by groundwater contamination resulting from the Bendix plant; continue to monitor the affected wells and the groundwater plume migration; and complete a Remedial Investigation and Feasibility Study (RI/FS) for the Bendix Site. The RI/FS for this Site was completed and submitted to EPA and PADER in July 1988. PADER has assumed the lead for oversight of the Superfund RI/FS activities at this Site.

II. Site Name, Location, and Description

The Bendix Site consists of approximately 60 acres of land in and near the Village of South Montrose, Bridgewater Township, Susquehanna County, Pennsylvania (see Figures 1 and 2). This site is situated atop a narrow, north to south-trending topographic divide between the Meshoppen Creek and Wyalusing Creek watersheds. Natural groundwater discharge areas occur in a swampy low swale in the Meshoppen Creek watershed east of and at the headwaters of the south branch of Wyalusing Creek west of the Site. The area within a 3-mile radius of the site is sparsely populated with the only concentrated areas being Montrose and South Montrose. Montrose is served by a municipal supply which draws surface water from Lake Montrose. The town of South Montrose (population = 500) is solely dependent on private groundwater wells for water.

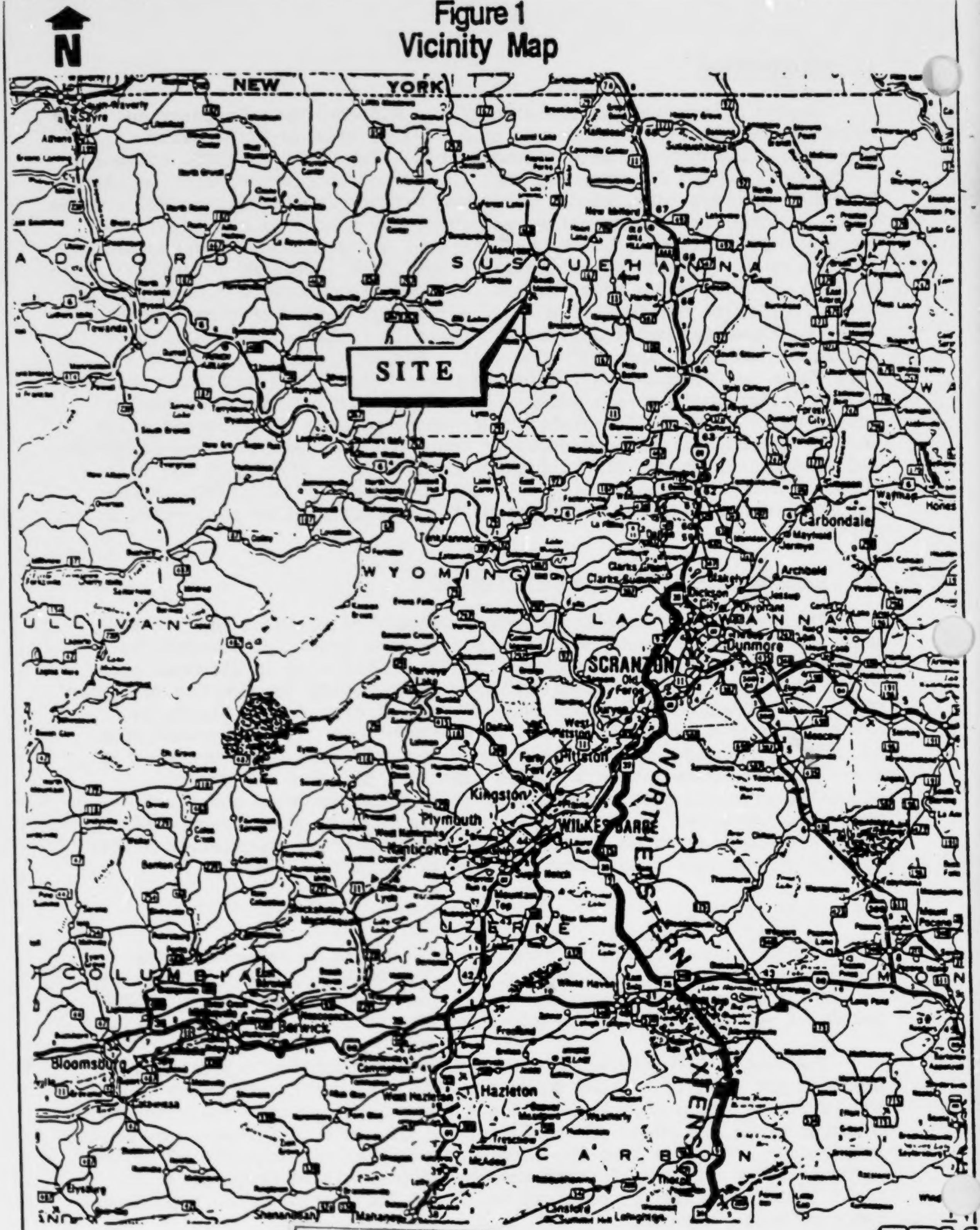
III. Site History

The Bendix manufacturing facility at the site is engaged in the production of aircraft instrumentation. For RCRA purposes this facility is identified as Small Generator Status and recycles approximately 1000 pounds of solvent per month by steam evaporation.

The Bendix Corporation, previously Bendix Aviation Corporation, acquired the parcels of land comprising the site during the years 1951 and 1952. Although the results of a title search indicate that The Bendix Corporation is the owner of record for all of the site parcels, corporate information indicates that The Bendix Corporation was acquired by Allied Corporation on January 31, 1983 and merged into Allied Corporation in April 1985. This merger resulted in Allied Corporation being the current owner of this property.

1.a

Figure 1
Vicinity Map


N
NEW YORK
SUSQUEHANNA
SITE
BRADFORD
Towanda
WYOMING
Tunkhannock
SULLIVAN
LACKAWANNA
Carbondale
Archbald
Dickson City
Olyphant
Dunmore
SCRANTON
Old Forge
West Pittston
Pittston
Forty Fort
Kingston
Plymouth
WILKES-BARRE
Nanticoke
LUZERNE
NORTHEASTERN EXTENSION
COLUMBIA
Berwick
Bloomsburg
Hazleton
West Hazleton
Freeland
CARBON
Shenandoah
Mahanoy City
Honesdale
Forest City
Clarks Summit
Mount Pocono
MONROE

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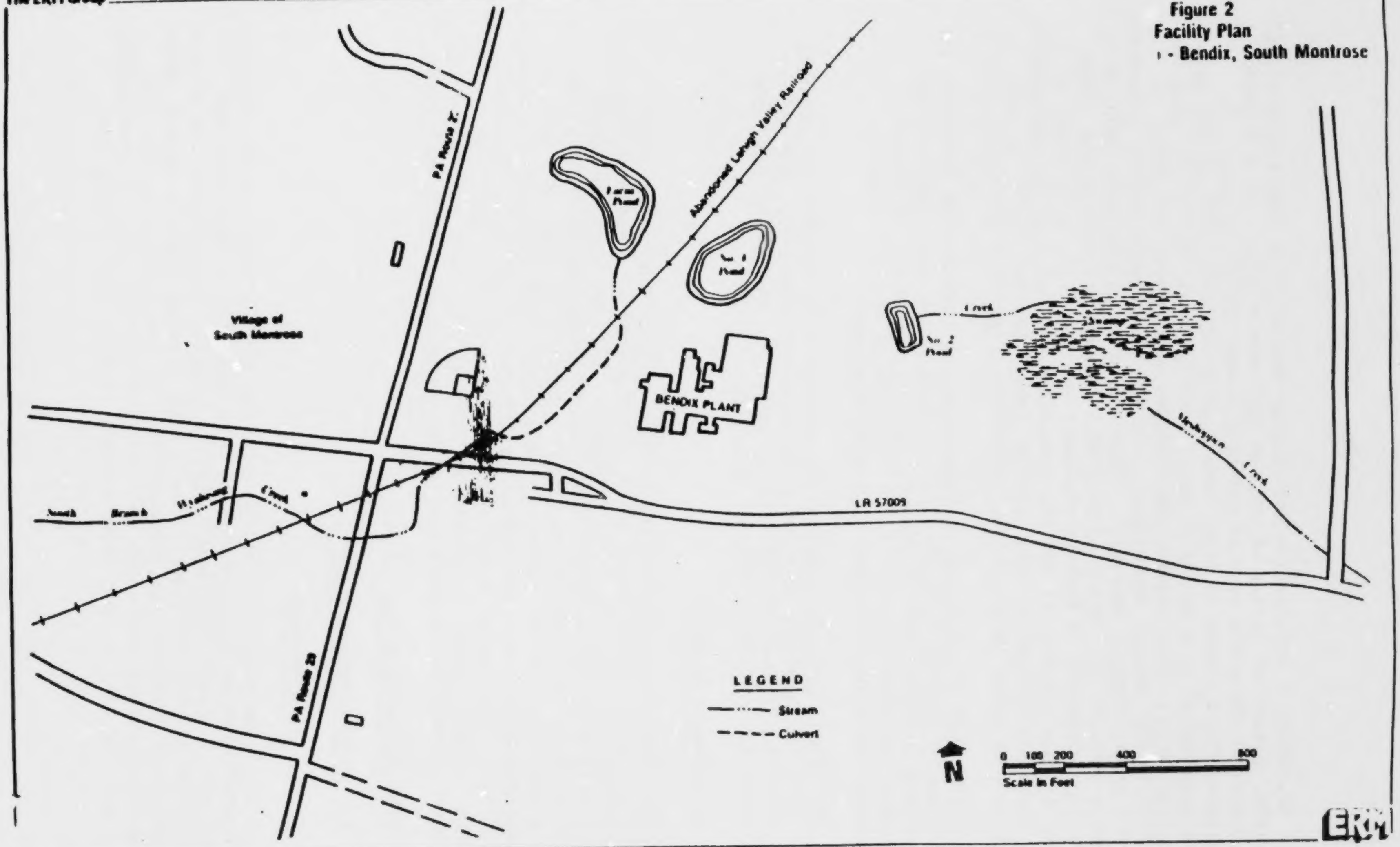
1.6

The ERM Group

Figure 2
Facility Plan
- Bendix, South Montrose



Abandoned Lehigh Valley Railroad
PA Route 7
PA Route 29
LR 57009
Village of South Montrose
Farm Pond
No. 1 Pond
No. 2 Pond
BENDIX PLANT
Swamp
Creek
South Branch Wyalusing Creek
LEGEND
Stream
Culvert
N
0 100 200 400 800
Scale in Feet
ERM

According to information provided by Bendix, from approximately 1952 to 1958, industrial wastes of unknown type were disposed of in a lagoon northeast of the plant near an existing sewage treatment plant. In addition, for a number of years (exact dates unknown), such wastes also were disposed of in a series of small trenches just east of the existing security fence. When closed, the trenches were graded and seeded to conform to the natural topography. There is no present surface indication of the prior disposal operation. From the early 1950's until 1978, an earthen disposal pit installed by Bendix and located east of the trench area (approximately 10 feet in diameter) was used for the disposal of water soluble cutting oil and oil contaminated water from air compressors. The basin was drained of free liquids, backfilled and seeded in late 1978 so that there is no surface indication of prior disposal operations.

No records exist on any of these sites to indicate the amount or all the types of substances disposed of at these locations. However, the results of an April 1982 groundwater quality assessment by Chester Engineers indicate the presence at this Site of various organic chemicals normally associated with hazardous waste.

The Bendix Site was proposed for inclusion on the National Priority List (NPL) in September 1985 and promulgated in June 1987. The HRS for this site was 33.74 which was based primarily on release of hazardous substances to groundwater beneath this Site.

IV. Enforcement History

Past disposal practices (involving hazardous substances which occurred between 1952 through 1958) have resulted in groundwater and soil contamination at this Site. On October 11, 1985 EPA sent the Bendix facility in South Montrose a CERCLA Section 104(e) information request letter to which the facility responded. On March 5, 1986, EPA sent the Bendix facility a letter informing the facility that it was a Potentially Responsible Party (PRP) and liable for the contamination at this site. In addition, this letter sought Bendix participation in the RI/FS process. Bendix agreed to conduct an RI/FS at this Site and entered into a Consent Order and Agreement for the performance of a RI/FS with PADER.

V. Site Characteristics

A. Geology/Hydrogeology

1. Site Geology

The results of the RI drilling program show that the unconsolidated overburden at the site consist principally of a brown silt and gravel till. Glacial till was deposited directly from glacial ice without significant sorting by water. This process creates a poorly sorted, dense sediment with generally low permeability. At the study site, the till varies in thickness from south to north from fourteen feet to over seventy feet, and from west to east from nineteen feet to over seventy feet.

The west to east (A-A' and B-B') geologic cross section in Figures 3 and 4 show the stratigraphic relationship of the till and underlying bedrock across the center and the northern boundary of the site.

In the southwestern section of the site, the till consists of firm, dense sand and silt. Northward and eastward, it becomes a hard silt and gravel till with varying amounts of clay and little sand. East of the plant buildings, the boring logs and backhoe pits indicate that the dense silt and gravel till is overlain by a zone of silt, subrounded gravel, and numerous large, flat sandstone chunks. This zone is from about two to eight feet in depth in the former pit/trench area. This unit is permeable and transmits ground water and appears to pinch out eastward. It appears that the shallow loose silt and gravel may persist beneath some of the plant area.

West of the plant buildings, in the parking lot area, a ten-foot thick section of loose gravel and organic-rich clay and silt was encountered at the land surface overlying the till unit. This zone consists of gravel fill installed under the parking lot and overlying stream and marsh sediments from the south branch of the Wyalusing Creek for which the headwaters originally occurred in this area. During parking lot construction, the creek was filled. The headwaters now arise west of the parking lot, adjacent to the village ballfield. The base of this fill unit is presently saturated. Northward and westward, this unit thins. Eastward, the gravel fill quickly pitches out at the surfaces; however; a loose silt and gravel unit is present under the plant site continuing westward and southward beneath the flat plant site area. This unit is about eight feet thick and may represent stream alluvium deposits in this area.

The greenish to greyish sandstone and grey to red siltstone and shale layers of the New Milford Formation were encountered during the drilling of the bedrock wells. This interlayered bedrock sequence was well cemented, well sorted, and firm except for the upper thirty feet, which was highly weathered and incompetent. The first saturated zone in Wells No. 84-9, 84-11, and 84-12 were 210, 135, and 160 feet deep and yielded only small volumes of water, probably less than 1 gpm. An apparent vertical fracture was penetrated in Well No. 84-10. The fracture was filled with loosely consolidated weathered rock set in a clay and silt matrix, and the potential water yield appeared to be several gallons per minute.

Figure 5 shows the configuration of the bedrock surface beneath the glacial deposits. As shown, a bedrock high slopes gently south to north beneath the center of the site, following the trend of the previously described surface topographic divide. East and west of the bedrock high, two symmetric swales are present, likely representing erosional surfaces formed by the headwaters of two pre-glacial streams separated by the topographic divide. Along the southern boundary of the plant, a bedrock outcrop is present with little glacial overburden evident. To the southwest beneath the Village of South Montrose, little or no glacial overburden is present, with bedrock outcrops observed in some house basements.

FIGURE 3
GEOLOGIC CROSS-SECTION A-A'

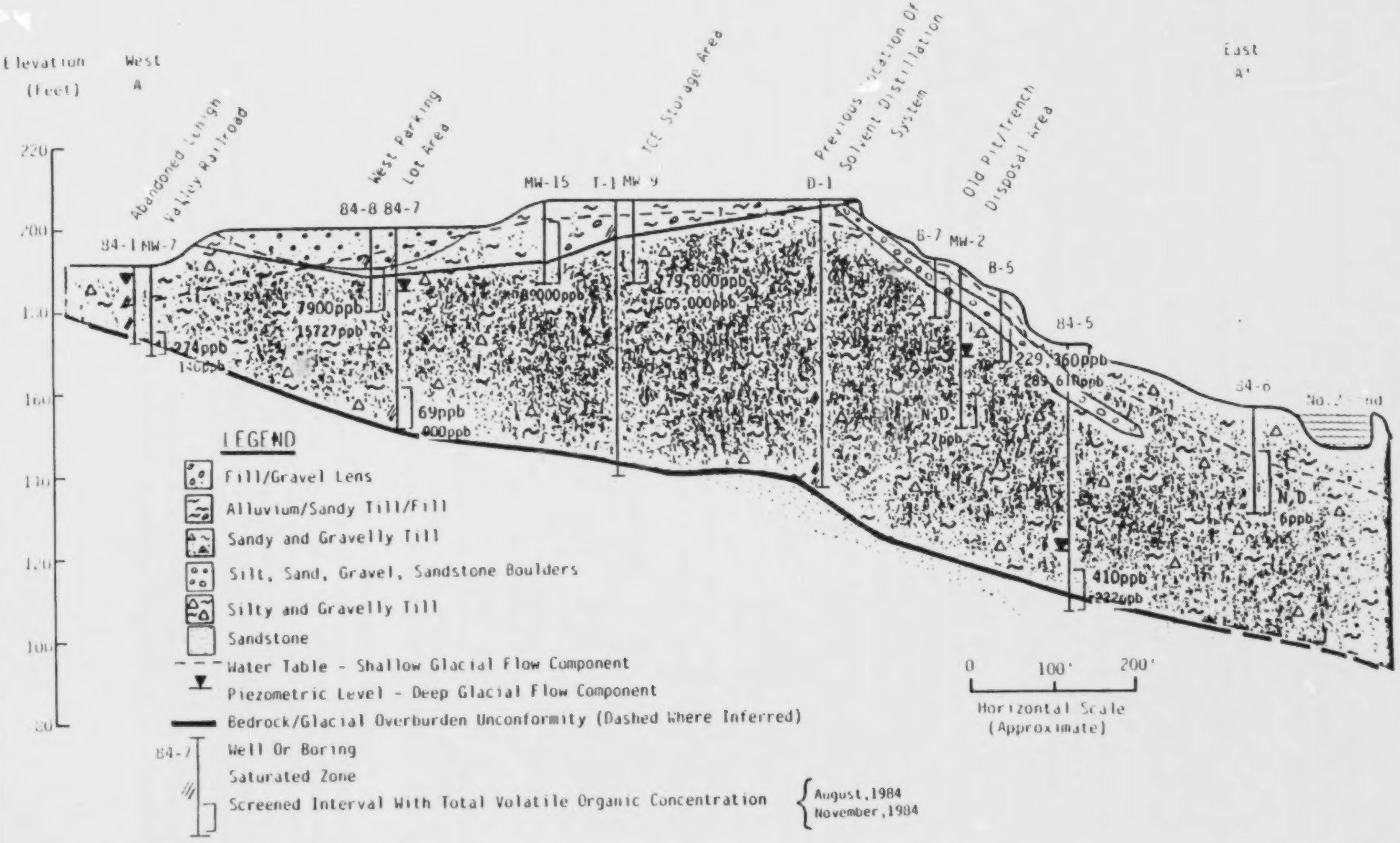
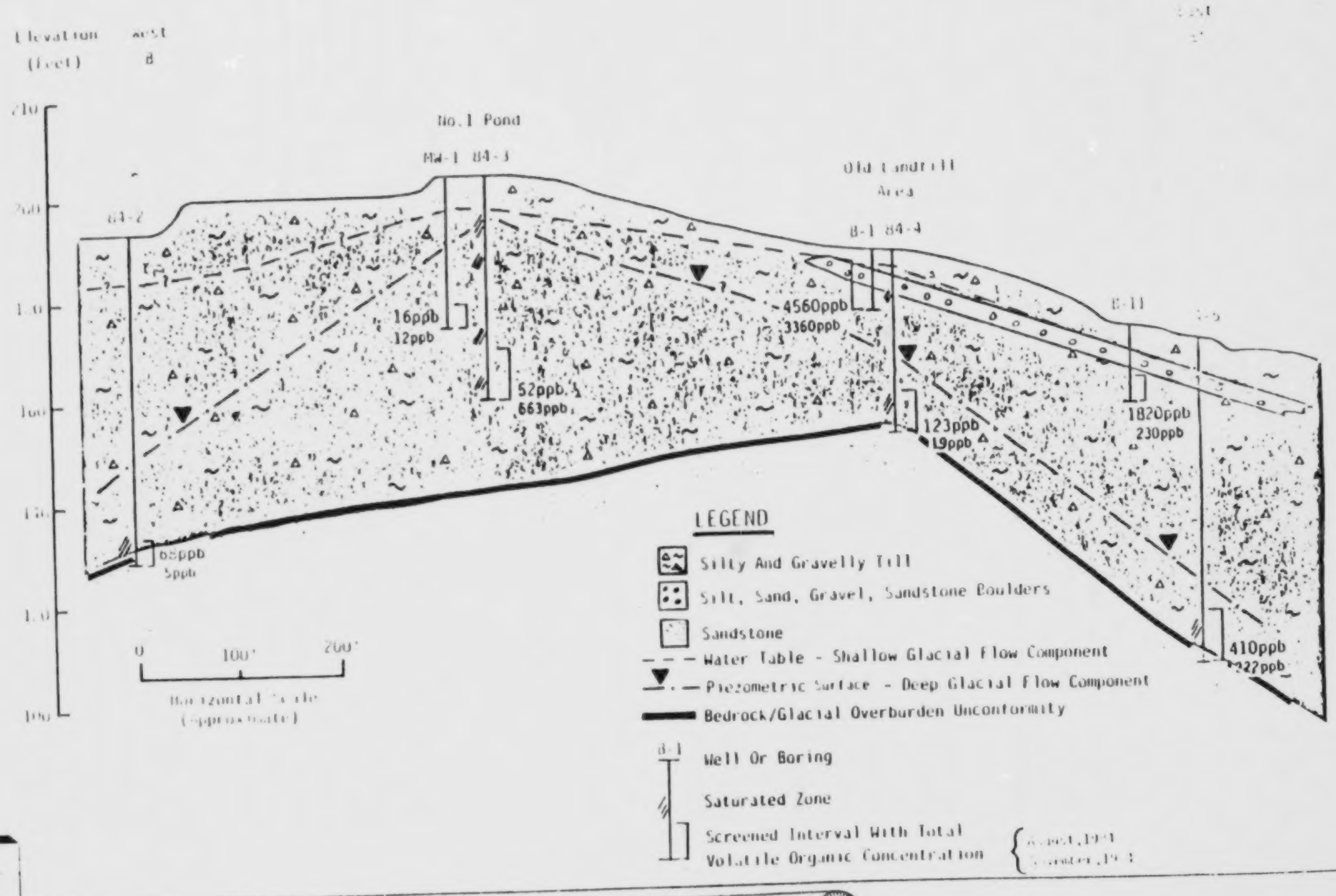

Elevation (Feet)
West A
East A'
220
200
180
160
140
120
100
80
Abandoned Lehigh Valley Railroad
West Parking Lot Area
TCE Storage Area
Previous Location Of Solvent Distillation System
Old Pit/Trench Disposal Area
84-1 MW-7
84-8 84-7
MW-15
T-1 MW 9
D-1
B-7 MW-2
B-5
84-5
84-6
No. 2 Pond
274ppb
130ppb
7900ppb
15727ppb
69ppb
900ppb
89000ppb
79,800ppb
505,000ppb
229,360ppb
289,610ppb
N.D.
27ppb
410ppb
222ppb
N.D.
6ppb
LEGEND
Fill/Gravel Lens
Alluvium/Sandy Till/Fill
Sandy and Gravelly Till
Silt, Sand, Gravel, Sandstone Boulders
Silty and Gravelly Till
Sandstone
Water Table - Shallow Glacial Flow Component
Piezometric Level - Deep Glacial Flow Component
Bedrock/Glacial Overburden Unconformity (Dashed Where Inferred)
84-7
Well Or Boring
Saturated Zone
Screened Interval With Total Volatile Organic Concentration
August, 1984
November, 1984
0
100'
200'
Horizontal Scale (Approximate)

FIGURE - 4
GEOLOGIC CROSS-SECTION B-B'


Elevation (feet)
210
200
West B
No. 1 Pond
MW-1 84-3
84-2
Old Landfill Area
B-1 84-4
B-11
16ppb
12ppb
52ppb
663ppb
4560ppb
3360ppb
123ppb
19ppb
1820ppb
230ppb
410ppb
322ppb
68ppb
5ppb
0
100'
200'
Horizontal Scale (Approximate)
LEGEND
Silty And Gravelly Till
Silt, Sand, Gravel, Sandstone Boulders
Sandstone
Water Table - Shallow Glacial Flow Component
Piezometric Surface - Deep Glacial Flow Component
Bedrock/Glacial Overburden Unconformity
B-1
Well Or Boring
Saturated Zone
Screened Interval With Total Volatile Organic Concentration

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2. Hydrogeology

A. Groundwater

Ground water at the Site occurs in two principal flow systems: a local system in the glacial overburden and a regional unconfined system in the fractures, joints, and bedding planes of the underlying bedrock. Flow in both systems is directed eastward and westward from the topographic divide. The installation of the new monitoring wells and the evaluation of the previously existing data have resulted in the definition of two apparent flow components in the glacial till system:

1. A shallow flow component is present in the overburden throughout the site. This flow component occurs primarily in the gravel fill/alluvium in the western part of the site, and in the shallow loose silt and gravel unit in the eastern portion of the site. This flow component is perched atop the denser underlying till in the central and eastern portions of the site. Beneath the west parking lot, this component appears to be directly hydraulically connected with the deeper flow component described below.

2. A deeper flow component is present in the till at the bedrock surface. The water within this zone appears to be confined to semi-confined and flows along the bedrock surface.

The basic hydrogeologic characteristics of each flow system are as follows:

1. Glacial Till Flow System

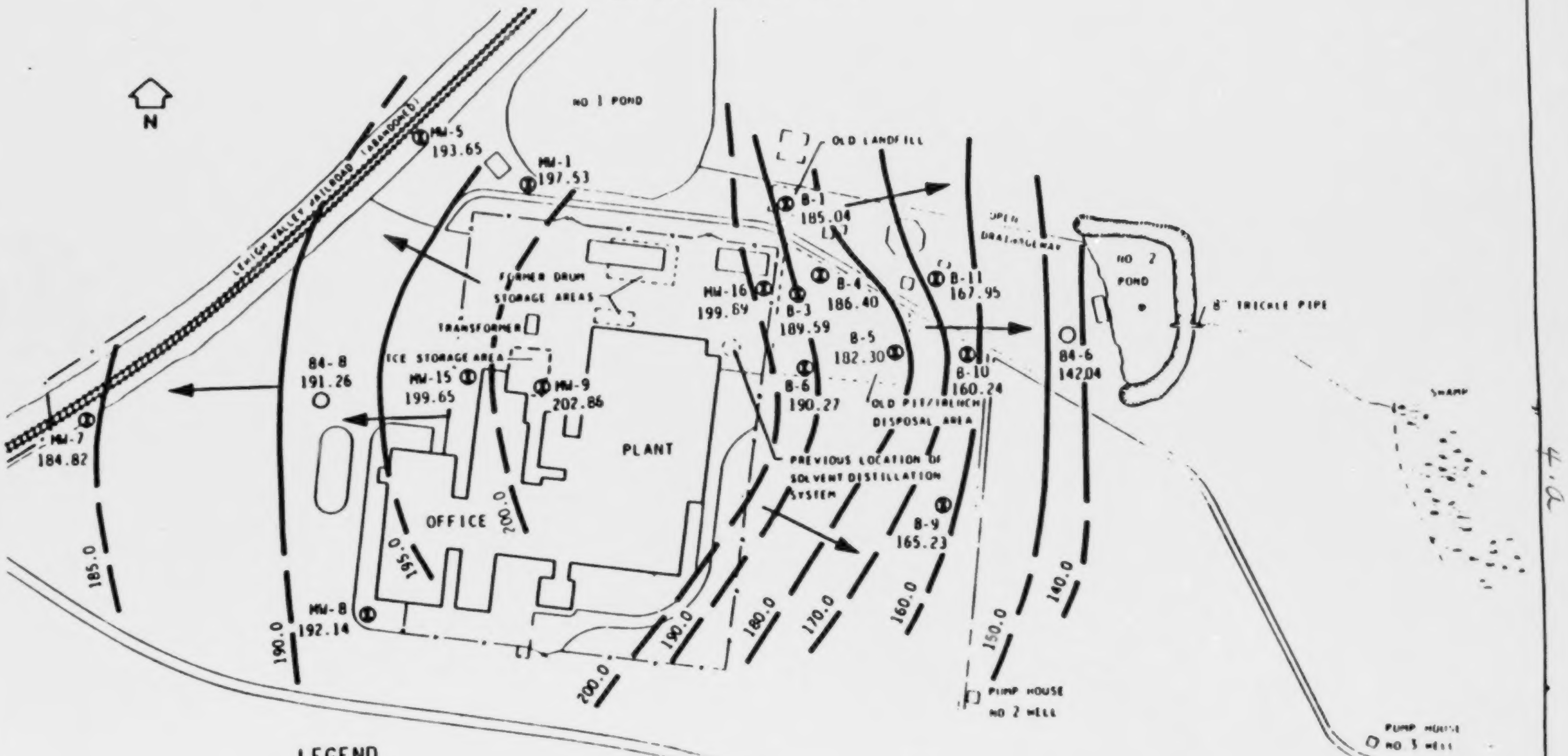
Shallow Component

The shallow flow component occurs in the gravel fill beneath the west parking lot and in the shallow loose alluvium, silt and gravel unit in the central and eastern sections of the site. A groundwater contour map for this component is shown in Figure 6. This map shows that flow is basically to the east and west from the surface divide beneath the plant area, suggesting that control is topographic. To the east, this system discharges to the swampy waters of the Meshoppen Creek watershed. To the west, flow proceeds under the parking lot to discharge to the headwaters of the South Branch of Wyalusing Creek.

In the fill beneath the parking lot, highly saturated conditions are present. This is to be expected as this was the natural discharge area for the shallow groundwater, and the fill beneath the parking lot is permeable gravel. It is likely that perennial recharge from the No. 1 Pond contributes additional recharge to the parking lot area. On the west edge of the parking lot no water was encountered in the shallow overburden during drilling. This indicates that shallow perched water conditions may be seasonal in this area. In the central and eastern sections of the

4.a

FIGURE 6
GROUND WATER CONTOUR MAP
SHALLOW GLACIAL FLOW COMPONENT
SEPTEMBER 17, 1984


N
NO 1 POND
OLD LANDFILL
LEHIGH VALLEY RAILROAD (ABANDONED)
MW-5
193.65
MW-1
197.53
B-1
185.04
OPEN DRAINAGEWAY
NO 2 POND
8" TRICKLE PIPE
FORMER DRUM STORAGE AREAS
TRANSFORMER
MW-16
199.69
B-3
189.59
B-4
186.40
B-11
167.95
B-5
182.30
B-10
160.24
84-6
142.04
84-8
191.26
ICE STORAGE AREA
MW-15
199.65
MW-9
202.86
B-6
190.27
OLD PIT/TRENCH DISPOSAL AREA
SWAMP
MW-7
184.82
PLANT
PREVIOUS LOCATION OF SOLVENT DISTILLATION SYSTEM
OFFICE
195.0
200.0
B-9
165.23
140.0
185.0
MW-8
192.14
190.0
180.0
170.0
160.0
150.0
200.0
PUMP HOUSE NO 2 WELL
PUMP HOUSE NO 3 WELL
PUBLIC ROAD

LEGEND

○ Shallow Overburden Well-ERM, 1984

Ⓖ Overburden Well-Chester Engineers, 1981, 1982

192.14 Ground Water Elevation

195.0 Ground Water Contour (Dashed Where Inferred)

→ Direction of Ground Water Flow

— · — Intermittent Water Of South Branch Wyalusing Creek

0 100 200 Feet

HORIZONTAL SCALE (APPROXIMATE)

property, the backhoe trench installation indicated that very little water was present in the loose silt and gravel unit. Thus, it appears that the shallow flow component in these areas is a seasonally perched condition.

Deep Component

The deep glacial till flow component occurs at the till/ bedrock interface. It was observed as a slightly wet zone in the bottom few feet of the deep wells. This flow is eastward and northwestward from the divide beneath the plant site. However, comparison of this map with the top of bedrock contours (Figure 5) shows that flow is down the bedrock surface slope instead of in the direction of the land surface slope (Figure 7).

The piezometric levels east of the plant area are very deep, indicating that flow is essentially unconfined in that area. To the west, however, the piezometric levels are well above the tops of the screens, indicating confined conditions. Discharge to the east is to the Meshoppen Creek watershed. To the west, where the flow is into the bedrock surface swale, the ultimate discharge area is uncertain. However, it may be that most of this water ultimately leaks slowly downward into the bedrock.

2. Bedrock Flow System

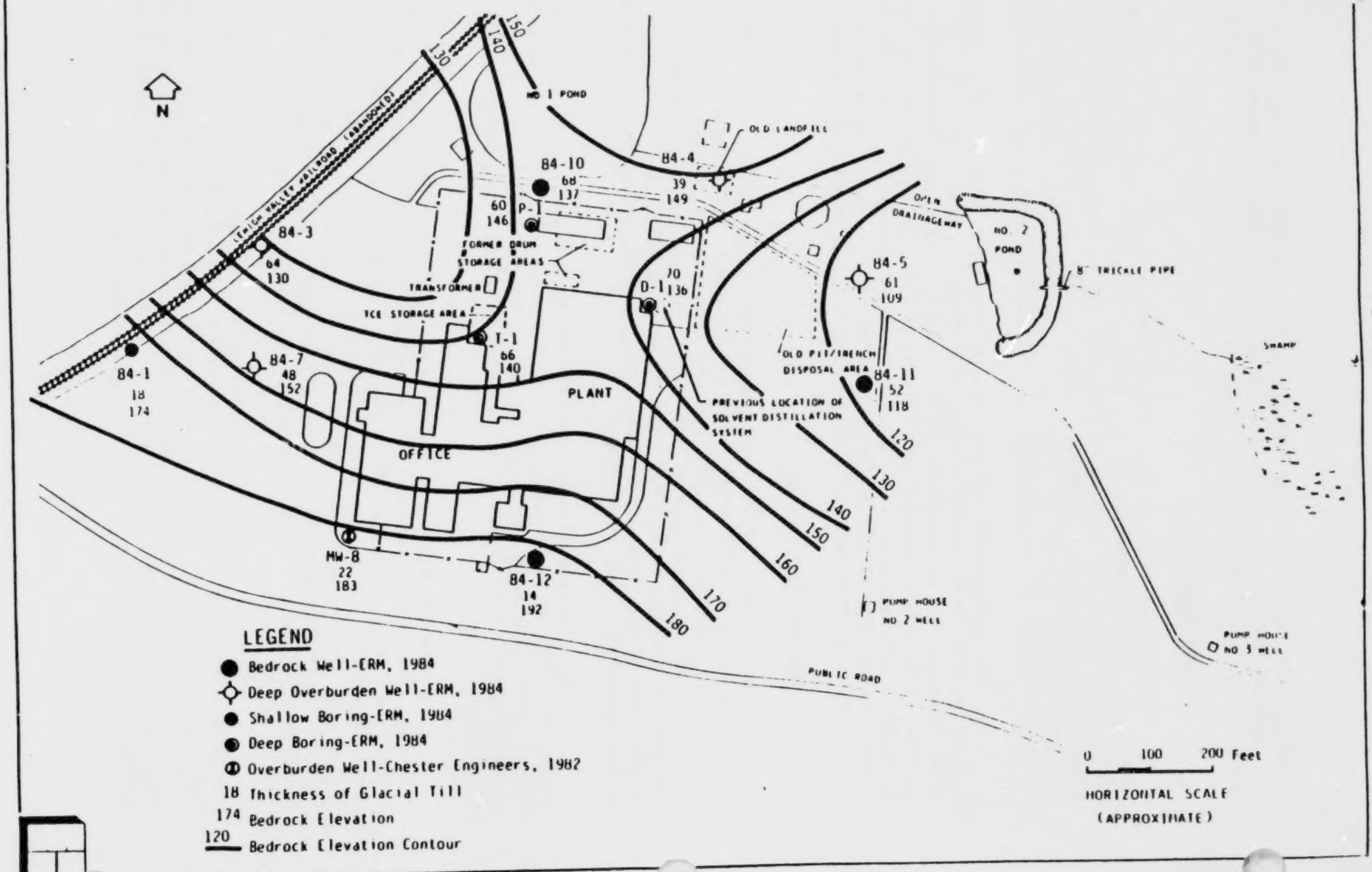
Groundwater in the bedrock aquifer occurs under unconfined conditions, with a thick sequence of unsaturated rock separating the deep glacial flow component from the bedrock system water table. East of the surface divide, ground water flows toward the east, likely discharging to the surface waters of the Meshoppen Creek watershed. West of the surface divide, the ground water flows principally to the southwest toward discharge in the Wyalusing Creek watershed.

The configuration of the bedrock system water table is shown in Figure 8. East of the topographic divide, ground water flow is directed by a narrow, southwest-trending "swale" in the groundwater table, suggesting that flow in this area is controlled by a southwest-trending fracture.

The water table and ground water quality results strongly suggest that this fracture may trend southwestward. The possible existence of such a fracture has been postulated on the basis of aerial photograph interpretation. The transmissivity along this fracture appears to be higher than that of the surrounding rock, thus essentially acting as a "drain" toward the southwest. This effect may be exaggerated by increased recharge supplied to the bedrock system by the No. 1 Pond water.

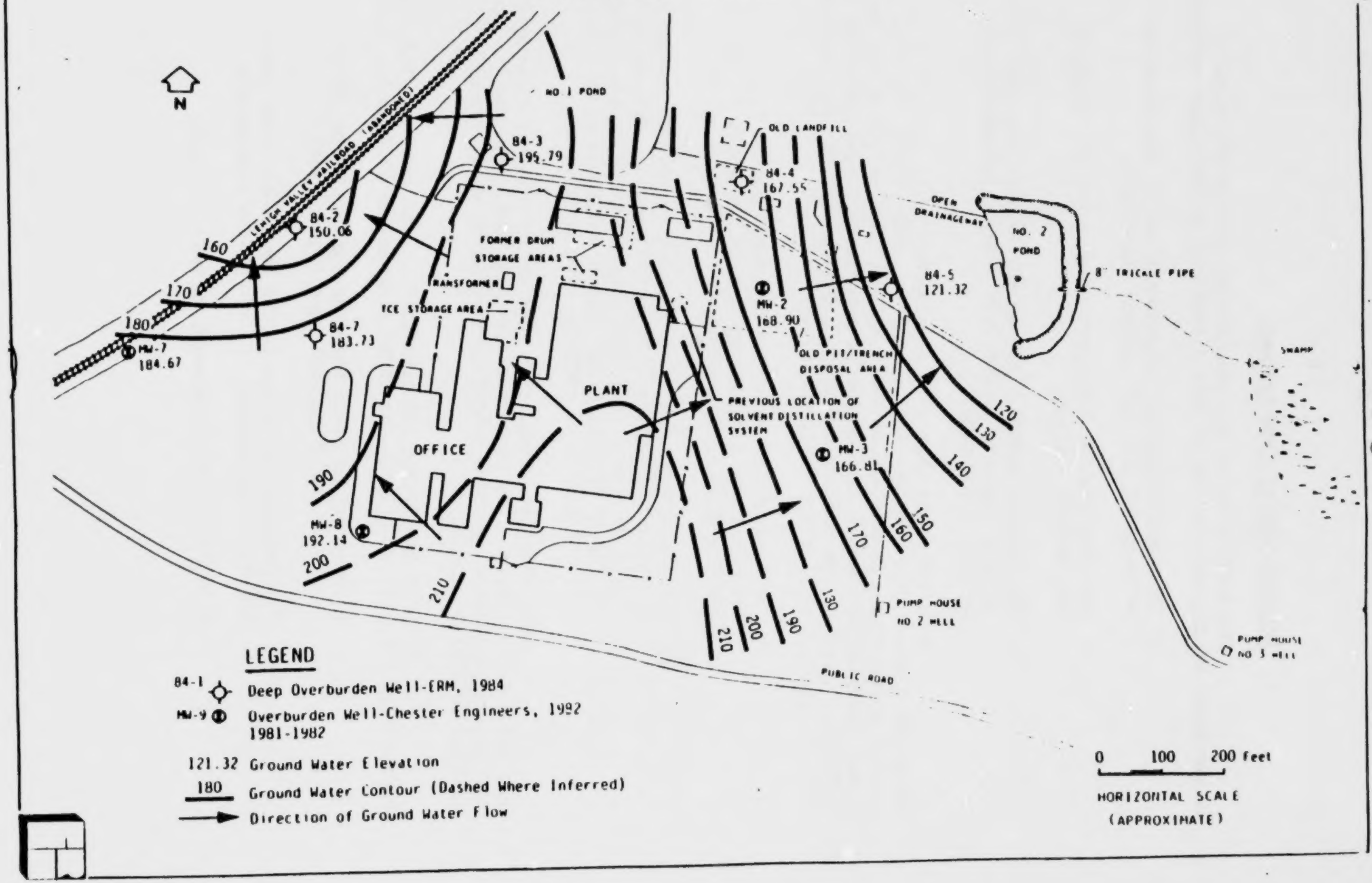
Principal ground water recharge to the bedrock flow system likely occurs on the ridge top south of the Bendix plant where bedrock is at or near the land surface. However, on-site conditions suggest that the till is well-drained enough to contribute some recharge to the bedrock as well. Thus, the saturated top of bedrock zone in the glacial till leaks slowly downward by unsaturated flow to the underlying water table.

FIGURE 5
BEDROCK SURFACE CONFIGURATION


N
LEHIGH VALLEY RAILROAD (ABANDONED)
130
140
150
NO 1 POND
OLD LANDFILL
84-4
39
149
84-10
68
137
60
146
P-1
FORMER DRUM STORAGE AREAS
TRANSFORMER
TCE STORAGE AREA
T-1
66
140
84-3
64
130
84-1
18
174
84-7
48
152
PLANT
OFFICE
MW-8
22
183
84-12
14
192
D-1
70
136
PREVIOUS LOCATION OF SOLVENT DISTILLATION SYSTEM
OPEN DRAINAGEWAY
NO. 2 POND
8" TRICKLE PIPE
84-5
61
109
OLD PIT/TRENCH DISPOSAL AREA
84-11
52
118
SWAMP
120
130
140
150
160
170
180
PUMP HOUSE NO 2 WELL
PUMP HOUSE NO 3 WELL
PUBLIC ROAD
LEGEND
Bedrock Well-ERM, 1984
Deep Overburden Well-ERM, 1984
Shallow Boring-ERM, 1984
Deep Boring-ERM, 1984
Overburden Well-Chester Engineers, 1982
18 Thickness of Glacial Till
174 Bedrock Elevation
120 Bedrock Elevation Contour
0
100
200 Feet
HORIZONTAL SCALE (APPROXIMATE)

-5-6

FIGURE 7
GROUND WATER CONTOUR MAP
DEEP GLACIAL FLOW COMPONENT
SEPTEMBER 17, 1984


N
NO. 1 POND
LEHIGH VALLEY RAILROAD (ABANDONED)
84-3
195.79
OLD LANDFILL
84-4
167.55
OPEN DRAINAGEWAY
NO. 2 POND
8" TRICALE PIPE
84-5
121.32
SWAMP
84-2
150.06
FORMER DRUM STORAGE AREAS
TRANSFORMER
ICE STORAGE AREA
MW-2
168.90
OLD PIT/TRENCH DISPOSAL AREA
PLANT
PREVIOUS LOCATION OF SOLVENT DISTILLATION SYSTEM
MW-3
166.81
160
170
180
MW-7
184.67
84-7
183.73
OFFICE
190
MW-8
192.14
200
210
120
130
140
150
160
170
130
190
200
210
PUMP HOUSE NO 2 WELL
PUMP HOUSE NO 3 WELL
PUBLIC ROAD
LEGEND
84-1 Deep Overburden Well-ERM, 1984
MW-9 Overburden Well-Chester Engineers, 1992 1981-1982
121.32 Ground Water Elevation
180 Ground Water Contour (Dashed Where Inferred)
Direction of Ground Water Flow
0
100
200 Feet
HORIZONTAL SCALE (APPROXIMATE)

3. Relationship of Flow Systems

The complexity of the groundwater flow at the Site is illustrated by the differences in flow directions in the three systems:

- The shallow glacial component flows in the direction of slope of the land surface topography.
- The deep glacial component flows along the slope of the bedrock surface.
- The bedrock system flows generally down the land surface topography, but with a major influence from bedrock fracturing.

This indicates that very limited hydraulic connection is present among the systems. If such vertical connection were strong, the flow pattern in each succeedingly deeper system would reflect that of the system above. A more detailed assessment of water level measurements also indicates this condition. East of the surface topographic divide, two factors indicate that the glacial till is not fully saturated:

- The piezometric levels in the deep glacial flow component are much deeper than in the wells in the shallow glacial flow component (Figures 6 and 7).
- The shallow glacial flow component responded promptly to an early November 1984 recharge event, with water levels up one to four feet from previous levels. However, the top of bedrock water levels continued to decline, indicating lack of recharge from above.

Thus, there is little or no hydraulic connection between the deep and shallow glacial flow components in this area. The shallow flow component is a seasonal perched condition from which only very slight downward discharge occurs.

West of the divide, several factors indicate that the full thickness of the glacial till is saturated beneath the parking lot fill:

- In response to early November 1984 recharge, water levels in top of bedrock rose significantly.
- The piezometric levels in the deep wells rose above the bottom elevations of the shallow piezometers.
- Flow in the deep component is semi-confined.

This full saturation was not observable during drilling, as the dense till contains very little water even under saturated conditions. However, the apparent saturation in this area is likely due to the perennial recharge available from the parking lot fill and likely from the No. 1 Pond leakage as well. A mounding effect in the piezometric surface of the deep flow component near the No. 1 Pond can be seen in Figure 4. This fully saturated condition is limited to the parking lot area.

Although vertical hydraulic connection appears to exist between the shallow and deep overburden beneath the parking lot, the principal flow vector is westward, laterally through the parking lot fill. The groundwater water quality analyses substantiates the fact that the actual vertical flow volume is very limited in this area. As previously noted, the deep unconfined water table in the bedrock aquifer indicates that there is no direct hydraulic connection with the deep glacial flow component. However, it is likely that slow downward leakage by unsaturated flow occurs to the bedrock system.

B. Surface Water

This facility is situated on an elevated parcel which separate the headwater areas of Meshoppen Creek and the South Branch Wyalusing Creek. The sanitary wastewater treatment system effluent discharges from the Number 2 Pond via a weir to natural channel which terminates in a swamp or wetland. Flow from the swamp constitutes the headwater of Meshoppen Creek. An unnamed farm pond to the west of the facility constitutes the headwaters of the South Branch Wyalusing Creek. The flow from the farm pond has been diverted into a culvert where the open channel flowed through what is now a filled and paved parking area. The approximate enclosed flow route is indicated in Figure 8 as well as the orientation of the headwaters of Meshoppe Creek.

Number 2 Pond

The Number 2 Pond serves as the final polishing step in the sanitary wastewater treatment system. The channel leading from the weir to the wetland consists rocky channel with a length of approximately 200 feet and a dr in elevation of 30-40 feet from the pond outfall weir to the wetland. This channel is interested by a gas pipeline right of way (ROW). From the pipeline ROW to the wetland, the water flowed through the alder fringe of the wetland.

Wetlands - Headwater of Meshoppen Creek

The wetland, which receives the outflow of the Number 2 Pond, consists of two distinct areas, namely an island of trees and shrubs (approximate size of 2 acres) surrounded by an approximate 20 acre area dominated by cattails. The area appears to have been a hemlock forest which may have been harvested in the past.

FIGURE 8
GROUND WATER CONTOUR MAP
BEDROCK SYSTEM - OCTOBER 20, 1984

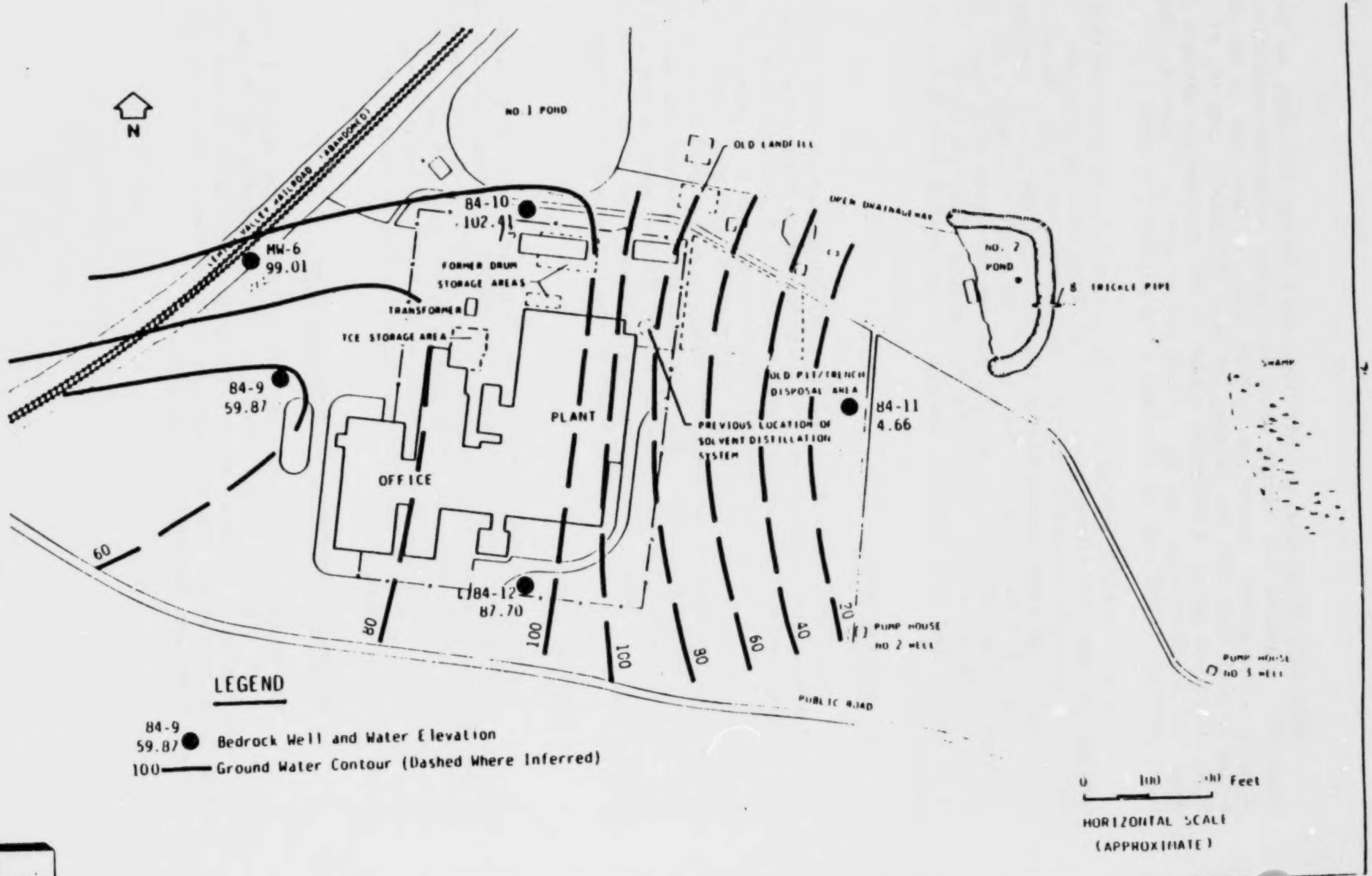

N
NO. 1 POND
OLD LANDFILL
OPEN DRAINAGEWAY
NO. 2 POND
8" TRICKLE PIPE
SWAMP
LEHIGH VALLEY RAILROAD (ABANDONED)
84-10
102.41
MW-6
99.01
FORMER DRUM STORAGE AREAS
TRANSFORMER
TCE STORAGE AREA
84-9
59.87
OFFICE
PLANT
OLD PIT/TRENCH DISPOSAL AREA
84-11
4.66
PREVIOUS LOCATION OF SOLVENT DISTILLATION SYSTEM
84-12
87.70
60
80
100
100
80
60
40
20
PUMP HOUSE NO 2 WELL
PUMP HOUSE NO 3 WELL
PUBLIC ROAD
LEGEND
84-9
59.87
Bedrock Well and Water Elevation
100
Ground Water Contour (Dashed Where Inferred)
0
100
200 Feet
HORIZONTAL SCALE
(APPROXIMATE)

Table 1, which lists ERM observed plant species as well as the FWS indicator status confirms the mapping of the area as a wetland. As a note of interest, the USGS Montrose West Quadrangles (photo revised 1978) indicates the eastern portion of the site as being open water which conflicts with the FWS delineation as shown in Figure 3. Observations from both transect vantage points indicated that the area mapped as open water by the USGS supported a dense cattail population, indicating that the area has been under wetland rather than open water conditions for at least several growing seasons.

4. South Branch Wyalusing Creek Headwaters

The headwaters of the South Branch Wyalusing Creek are the outfall of the farm pond located to the west of the Number 1 Pond (see Figure 2). The flow from this pond flows through a culvert as the water passes under the filled and paved parking area. The culvert discharge is directed through a second culvert which carries the water under the abandoned Lehigh Valley Railroad ROW. Downstream of this railroad ROW, the flow follows a natural channel. Near the intersection with LR 57009 (as identified in Figure 2) the flow pattern becomes braided and supports a wetland (approximately one-quarter acre based on field observation) consisting of two small stands of cattail.

B. Extent of Contamination

1. Soil Contamination

The primary source of contamination at the site is subsurface soils. This contamination has leached out into the groundwater underlying these soils. The following lists the source areas of contamination:

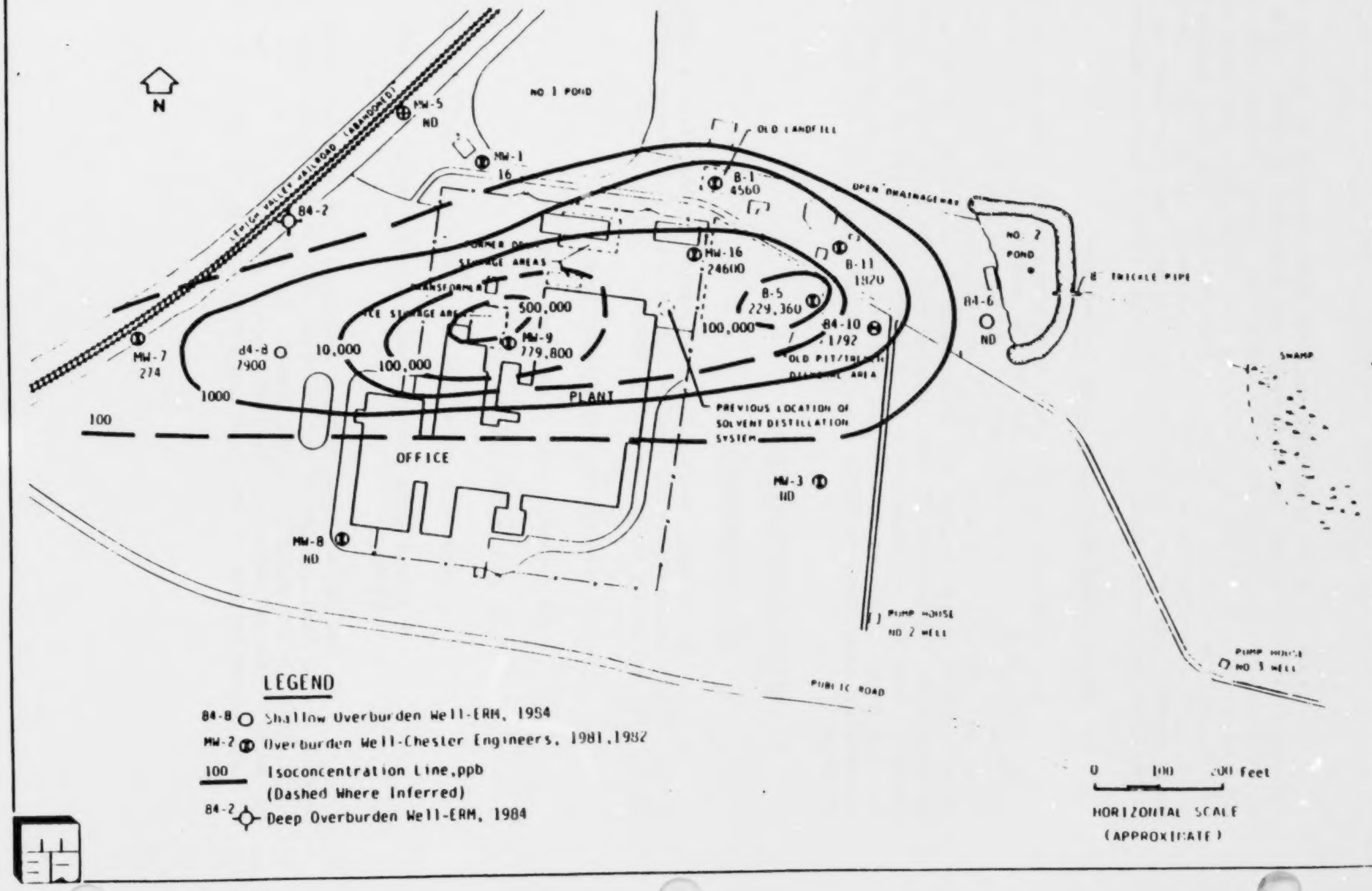
- the area of the TCE storage tank,
- the formerly used pit/trench area,
- the old landfill area,
- the area of a former solvent evaporation facility, and
- a former drum storage area directly behind the plant building.

The soils investigations indicated that volatile organics are present in the shallow zone of ground water flow in the source areas at the plant, both in the vapor and water phases, and adsorbed on the soil (see Figure 9). The contamination decreases quickly with depth, and the restriction of high concentrations to the upper weathered zone in the potential source

-8-a

FIGURE 9

ISOCONCENTRATION MAP - TOTAL VOLATILE ORGANICS IN SHALLOW GLACIAL COMPONENT, AUGUST, 1984


N
NO 1 POND
LEHIGH VALLEY RAILROAD (ABANDONED)
MW-5 ND
MW-1 16
84-2
OLD LANDFILL
B-1 4560
OPEN DRAINAGEWAY
NO. 2 POND
8" TRICKLE PIPE
FORMER DRUM STORAGE AREAS
TRANSFORMER
MW-16 24600
B-11 1920
B-5 229,360
84-10 1792
84-6 ND
OLD PIT/TRENCH DISPOSAL AREA
ICE STORAGE AREA
500,000
MW-9 779,800
100,000
10,000
1000
100
MW-7 274
d4-8 7900
PLANT
OFFICE
PREVIOUS LOCATION OF SOLVENT DISTILLATION SYSTEM
MW-3 ND
MW-8 ND
SWAMP
PUMP HOUSE NO 2 WELL
PUMP HOUSE NO 3 WELL
PUBLIC ROAD
LEGEND
84-8 Shallow Overburden Well-ERM, 1984
MW-2 Overburden Well-Chester Engineers, 1981,1982
100 Isoconcentration Line,ppb (Dashed Where Inferred)
84-2 Deep Overburden Well-ERM, 1984
0 100 200 Feet
HORIZONTAL SCALE (APPROXIMATE)

areas strongly suggests that the unweathered zone of dense silt matrix glacial till vertically restricts contaminant migration. Thus, it has been determined that the soil contamination of potential concern is limited to the upper ten to twenty feet of soil. These soils may be considered as a continuing source of ground water contamination, although their effect on the regional ground water is perhaps limited by the intervening presence of the unweathered glacial till.

2. Groundwater Contamination

Ground water contaminant movement through advection and dispersion is the principal pathway of migration at the Site. Hydrolysis, sorption, oxidation, and biodegradation are not considered to be significant fate processes for the contaminants of concern, indicating that the ground water pathway offers little retardation of contaminant movement.

The hydrogeologic investigations revealed that ground water at the Site occurs in two flow systems consisting of the following three components: a system in the glacial overburden consisting of a shallow zone of a perched groundwater component less than twenty feet deep; a deeper flow system component at the glacial till/bedrock interface; and a regional flow system in the underlying bedrock aquifer.

Hydraulic connection among the three flow system components is limited by the presence of a dense glacial till directly overlying bedrock. Flow in the overburden systems is principally lateral, generally toward the east and west from a topographic high beneath the Bendix plant. However, some limited leakage of water downward between flow systems does occur which is evidenced by the low VOC concentrations detected in the regional aquifer. The Village of South Montrose residents use the bedrock aquifer for water supply via domestic wells, and Bendix uses it for process and potable water via production wells.

The groundwater contamination is concentrated in the shallow flow zone, where it ranges from a few hundred to hundreds of thousands of ppb beneath the plant property. Beneath the west parking lot, gravel fill material is present that contains several thousand ppb of volatile organics. In this area, volatile organics of up to 1,000 ppb have been shown to have migrated vertically to the top of bedrock flow zone and from there to the bedrock aquifer, where the concentrations are 100 to 150 ppb. In the bedrock system, the contaminants have migrated southwestward along a bedrock fracture.

In the eastern section of the Site, volatile organics up to several hundred thousand ppb are present in the shallow flow zone at the former pit disposal site. There appears to be very limited downward migration of contaminants in this area due to restrictions on flow through a thick unsaturated glacial till. However, VOC concentrations of several thousand ppb have been detected in the top of the bedrock flow zone at one location.

3. Surface Water Contamination

The initial hydrogeologic investigation found no volatile organics in a marsh located on the eastern portion of the site, which forms the headwaters of Meshoppen Creek. Wyalusing Creek is a headwater stream which crosses the western property boundary of the site; the headwaters area of the Wyalusing Creek watershed was dry during the initial field investigation. Since the stream could be a discharge area for the ground water contamination beneath the parking lot, samples were taken during the wet season from the parking lot drain pipe and three samples were taken selected locations in the stream itself. This sampling and analysis indicated the presence of low levels of trichloroethylene and trans-1,2-dichloroethylene at the point of discharge. Samples taken downstream exhibited lower concentrations. Samples of pond water have also been analyzed. This sampling also indicated the presence of low levels of trichloroethylene and trans-1,2dichloroethylene.

Additional surface water samples were collected and analyzed as part of the Supplemental Remedial Investigation. The results correlate with those reported above, indicating the presence of low levels of trichloroethylene and trans-1,2-dichloroethylene in surface waters.

4. Air Contamination

Minimal air monitoring data have been required by the EPA at the site, since all of the contamination is subsurface. As part of the RI, Organic Vapor Analyzer (OVA) readings were taken in each of the four suspected source areas, the TCE Storage Area, the former solvent evaporation area, the old landfill area, and the former pit/trench disposal area. Two background OVA readings were taken as well. No detectable concentrations of VOCs above background concentrations were observed. Also, no odors were detected, and in the absence of disturbance of contaminated soils, volatilization of contaminants and subsequent transport by air is not expected to be an exposure pathway.

5. Sediment Contamination

Analysis of the sediment from the No. 1 Pond showed trace concentrations of toluene, an organic compound that was not detected in the water analysis. In the No. 2 Pond, trace concentrations of toluene and ethylbenzene were detected in the sediment sample from the north end and no volatile compounds were detected in the sample from the south end.

C. Summary of Site Risks

The following conclusions are based on the analyses performed in the July 1988 risk assessment.

- The maximum detected levels of carbon tetrachloride and trichloroethylene and the projected concentration of vinyl chloride in the regional aquifer exceed MCLs.

- The maximum detected levels of benzene, chloroform, and trichloroethylene in surface water exceed their respective Ambient Water Quality Criteria for drinking water and ingestion by organisms.
- The maximum detected level of trichloroethylene in surface water exceeds its Ambient Water Quality Criteria for ingestion by organisms only.
- The maximum detected level of trans-1,2-dichloroethylene exceeds its Ambient Water Quality Criteria for acute protection of aquatic life.
- All other potential ARARs are not violated by existing site conditions.

In summary, ambient site conditions represent an acceptable level of risk, with the exception of projected migration of vinyl chloride from beneath the old landfill area to the regional aquifer. As stated previously, to-date no vinyl chloride has been detected in the regional aquifer. However, elimination of the source of contamination represents a desirable action for long-term protection of human health and the environment.

VI. Community Relations History

The main community concerns for the affected residents and business revolve around the issues of how much time will cleanup take; will the contamination spread further; and can groundwater be effectively cleansed. PADER and Bendix have worked cooperatively to inform each resident and business person of sample results and significant remedial or pilot activities. Bendix also agreed with PADER's request to provide bottled water to all affected individuals during the initial evaluation of the contamination. Bendix then installed dual-stage carbon filters to PADER specifications, and is continuing to rebed and maintain these filters while conducting periodic sampling of the affected wells.

VII. Remedial Alternative Objectives

The major objectives of remedial work to be taken at the Bendix Superfund Site include: (1) removal of soil contaminants to protective levels; (2) minimization of the amount of hazardous substances leaching into the groundwater; (3) treat groundwater both on and off-site to <1 ppb TCE; (4) protecting the human population which utilizes groundwater for both contact and drinking water purposes.

Based on the above objectives, numerous source control and mitigation control technologies were screened to provide a limited number of technologies applicable for remedial actions at the Site.

Section 121 of SARA and the current version of the National Contingency Plan (NCP) (50 Fed. Reg. 47912, November 20, 1985) establish a variety of requirements pertaining to remedial actions under CERCLA (See Table 1). The following nine criteria were used in the evaluation of the remedial action alternatives at the Bendix Site:

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARS addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and/or provides ground for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environmental over time once cleanup goals have been met.

- Reduction of toxicity, mobility or volume is the anticipated performance of the treatment technologies a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection,,and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the techical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs and net present worth costs.

- State Acceptance indicates whether, based on its review of RI/FS and Proposed Plan, the State concurs on, opposes, or has no comment on the preferred alternative at the present time.

- Community Acceptance will be assessed in the Record of Decision following a review of the public comments received on the Administrative Record and Proposed Plan.

VIII. Description of the Alternatives

A. Remedial Alternative Evaluation

1. Technologies Available

Each technology was evaluated not only in terms of theoretical feasibility, but also in terms of whether the technology is applicable to the site specific conditions. The technologies that have been retained for further analysis, after the initial technology review occurred, can be grouped into the following nine categories:

1. No-action with Contaminant Plume Monitoring
2. Excavation and Secure Off-Site Disposal
3. Capping
4. Vacuum Extraction
5. Soil Aeration
6. Containment of Bedrock Plume by Pumping and Treatment On-Site
7. Air-stripping Surface Water (i.e. Parking Lot Drain)
8. On-Site Shallow Groundwater Collection and Treatment
9. Off-Site Groundwater Treatment

To analyze these technologies, an evaluation was conducted that considered the requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA) (P.L. 99-499) and the current version of the National Contingency Plan (NCP) (50 Fed. Reg. 47912, November 20, 1985). Three broad categories were used for the evaluation: effectiveness, implementability, and cost. Within these categories there are seven factors that consider the short-term and long-term effects of each alternative (see Table 1). The evaluation is presented in detail in the Bendix Site RI/FS report. The following is a summary of the evaluation.

Technology - 1. No-Action with Continued Contaminant Plume Monitoring

The NCP requires that the no-action alternative be considered. This alternative will have no environmental or public health benefits. It will not be protective in the short-term or the long-term. The environmental and public health problems will continue into the foreseeable future.

Technology - 2. Excavation and Secure Off-Site Disposal

Using this method, contaminated soils would be excavated and transported offsite for disposal. Another important limitation is off-site disposal capacity. This method is not applied to less contaminated soils that are present at this site.

The method of off-site disposal is dependent on the concentration of halogenated organic compounds in the soil. After November 8, 1988 all CERCLA soil and debris generated by 104 and 106 response actions can not be land disposed ("Land Ban") unless a waiver is obtained.

Technology - 3. Paving or Capping to Eliminate Infiltration

This prevents rainwater from infiltrating through the contamined soil minimizing contaminated recharge to groundwater. Paving is done in areas where any foot or motorized traffic occurs. This allows normal use of the area, while preventing infiltration. Capping, on the other hand occurs in unused areas, and effectively prevents dermal contact and infiltration. Capping may be accomplished, as specified in the RCRA regulations, using clay, an artificial membrane, or a combination thereof.

TABLE 1

EVALUATION FACTORS FOR ALTERNATIVE EVALUATION

	EFFECTIVENESS		IMPLEMENTABILITY			COST	
	Protectiveness	*Reduction of Toxicity, Mobility, or Volume*	*Technical Feasibility*	*Administrative Feasibility*	*Availability*	*Remedy*	*Replacement*
SHORT-TERM	Reduction of existing risks Compliance with ARARs Compliance with other criteria, advisories, and guidances Protection of community during remedial actions Time until protection is achieved		Ability to construct technology Short-term reliability of technology	Ability to obtain approvals from other agencies Likelihood of favorable community response Coordination with other agencies Development of future coordination network Compliance with some location-specific ARARs	Availability of treatment, storage, and disposal services and capacity Availability of necessary equipment and specialists	Development and construction costs Operating costs for implementing remedial action Other capital and short-term costs until remedial action is complete	
LONG-TERM	Reduction of future risks Long-term reliability Compliance with ARARs Prevention of future exposure to residuals Potential need for replacement	Permanent and significant reduction of toxicity, mobility or volume Use of permanent solutions and treatment technologies or resource recovery technologies	Ease of undertaking additional remedial action, if necessary Ability to monitor effectiveness of remedy Ability to perform operation and maintenance functions			Costs of operation and maintenance for as long as necessary Costs of 5 year reviews	Potential for remedial action or replacement costs if remedy were to fail

Technology - 4. Vacuum, Extraction

Vacuum extraction is a technology that allows in situ removal of organic compounds from the soil. The treatment system consists of extraction wells placed in a grid pattern throughout an affected area and screened in the zones of soil contamination. The extraction wells are coupled to a common header system which is attached to a high-efficiency blower. The blower induces a partial vacuum in the system which effectively lowers the ambient air pressure in the soils. This creates a non-equilibrium condition which causes the liquid phase contaminants in the soils to undergo a phase change to a gaseous phase. As this vapor is removed, the concentrations of volatile contaminants in the soil are reduced. The exhaust from the blower system may be treated using a carbon adsorption vapor recovery system if treatment is determined to be necessary.

This method is well suited for remediation affected soils under and around permanent facilities. This method is dependent on the movement of air through the unsaturated zone. Because of the occurrence of fine, low permeability soils at this site, vacuum extraction would require the wells to be very closely spaced.

Technology - 5. Soil Aeration

The 1985 evaluation of alternatives included on-site purging by excavation and forced aeration. Since the completion of that study, ERM has develop and tested better methods of removing VOCs from soils. As an alternative to the method proposed for on-site purging of soils contamination, mechanical sieves would be utilized for aeration of the affected soils after excavation. A mechanical sieve is a conventional piece of portable construction equipment normally used for on-site grading of road construction materials. The mechanical sieve disaggregates the contaminated soils, facilitating the release of interstitial VOCs from the soil matrix.

Using this technology, affected soils are excavated using a backhoe or hydraulic excavator. The excavated soils are then dumped into the loading hopper of the mechanical sieve. The mechanical sieve processes the excavated material through a series of grates and blades to break down the soils. The soil is then carried up a conveyor belt to a set of shaking screens, where it is then dropped through the air to piles on plastic sheeting. Samples are collected from the piled material to determine whether target soil concentrations have been met (i.e. 100 ppb leachable VOCs). Some soils may require more than one pass through the sieve to achieve the target concentrations.

Technology - 6. Containment of Bedrock Plume by Pumping Production Wells and Carbon Infiltration Treatment

In implementing this technology, Bendix production wells 2, 3, and 4 would be run continuously, instead of periodically, as they are now, to prevent contaminant migration to off-site wells. The supplemental RI showed that all groundwater east of the hydrologic divide beneath the plant flows toward an east-west trending fracture which serves as the source of yield to the production wells. At the current average pumping rate of approximately 50,000 gpd, all of the VOC plume east of the groundwater divide is controlled. Any off-site migration has been due to the noncontinuous nature of the pumping. Thus, as long as the Bendix production wells are pumped continuously at a rate equal to or greater than the existing average production rate, no further contamination will migrate off-site. The groundwater pumped from the bedrock aquifer to prevent off-site migration would be treated via the existing carbon adsorption units. The water pumped by the production wells would be passed through the Calgon Model II Dual Carbon Adsorber. The excess production water would then be discharged to Pond 1.

Technology - 7. Air-Stripping Surface Water

In implementing this technology, perforated tubing and an air compressor would be provided in order to aerate the flow in the existing parking lot storm sewer. Aeration of the flow in the sewer would volatilize the VOCs present in the water due to infiltration of contaminated groundwater. This alternative would provide treatment to prevent the discharge of VOCs to Wyalusing Creek.

Technology - 8. On-Site Shallow Groundwater Collection by Trenching and Treatment UV-Peroxide

In implementing this technology, shallow groundwater would be recovered in a fifteen-to-twenty foot deep collection trench located perpendicular to the axis of the shallow contaminant plume. This trench would be located at the eastern edge of the parking lot fill to intercept the 10,000 ppb and greater concentrations of contaminants from the plant area. This water would either be pumped to storage for batch processing of air stripping or UV-Peroxide treatment or be pumped directly to the existing Calgon Model II carbon model filtration unit. This alternative would serve to cut off the contaminant source from the bedrock flow system. Thus, as the residual contamination in the downgradient materials decreases, the discharge of contaminants to the bedrock system would diminish.

Technology - 9. Off-Site Groundwater Treatment

Off-site migration of contaminated groundwater would be eliminated by cleaning up the highly contaminated soils in the TCE Tank Areas and by capturing the contaminated groundwater in the overburden via a recovery trench or another method of dewatering. Pumping from the bedrock aquifer on the West Side of the groundwater divide is not an acceptable alternative as a Bendix production well on the west side of the plant was abandoned in the past due to interference of water supply of downgradient residential wells. Once VOC mass loading to the bedrock is eliminated, concentrations of VOC in the bedrock should be reduced to less than 1 ppb fairly rapidly due to the high velocities in the bedrock fracture zone. However, to account for the fracture zone by induced pumping of domestic wells, an additional ten years is estimated. Thus, a range of approximately 11 to 30 years is considered possible for remediation. Domestic wells will continue to be monitored and provided with carbon filtration units until the groundwater remediation has been completed.

2. Alternatives Presentation

Due to the topography and distinct groundwater system the Bendix Site has been divided into two areas of remediation, the east and west sides of the topographic divide. The east side includes three areas of source contamination: The former Pit/Trench Area, the old Landfill Area, and the former solvent Evaporation Area. The west side includes the former TCE Storage Tank Area. The impermeability of the glacial till and the unsaturated zone prevents the use of conventional methods of groundwater recovery in the east side. Remediation of the west side is complicated by the impermeability of the glacial till, the location of the building in the area of heavy contamination, the location of the unconsolidated parking lot fill and recharge of the hydrogeologic system.

A. East Side

Remediation alternatives for the East Side are targeted at the following objectives:

- Prevention of migration of contaminants from the shallow flow zone to headwaters of Meshoppen Creek and;
- Recovery of contaminated groundwater in the bedrock aquifer.

The East side can be subdivided into five areas for the purpose of defining and comparing alternatives. These consist of:

1. the Pit
2. the former Landfill
3. the Evaporation Area
4. the Trench Area and the less contaminated area surrounding each of the above areas
5. the Bedrock Aquifer.

Summary of Alternatives

Table 2 summarizes the alternatives according to the applicable assessment factors for the east side, the following is a brief synopsis of the remedial measures. See Appendix A for explanation of soil treatment limit of 100 ppb leachable VOCs.

Alternative - 1.

No remediation of the sources or the contaminated groundwater is undertaken. Restrictions concerning the use of the site and the groundwater are entered in the property deed. Monitoring of the groundwater is conducted to track the extent and movement of the contamination.

Alternative - 2.

This involves the aeration of soils from the Landfill, Pit/Trench and the Evaporation Areas. Soil aeration involves the excavation of the contaminated soils above the 100 ppb leachable level for processing through a mechanical sieve where the soils are disaggregated, facilitating the release of VOCs from the soil matrix. The soils are passed through the process until they are reduced to the 100 ppb level for leachable VOCs. It is expected that this system would take approximately 24 months to remediate the leachable VOCs to the 100 ppb level. The pumping of the Bendix production wells at a predetermined rate would effectively contain the contaminant plume and prevent off-site migration. The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions specified by the ACO.

Alternative - 3.

Highly contaminated sources in the Pit and the Landfill will be excavated to the 100 ppb level for leachable VOCs and removed off-site for secure disposal. An estimated total of 640 cubic yards of contaminated soils would be removed. A soil vacuum extraction system would be installed in the Evaporation and Trench Areas. It is expected that this system would take approximately 24 months to remediate the soils to the 100 ppb level for leachable VOCs. The remediation of the Pit and Landfill source areas would be immediate. The pumping of the Bendix production wells would effectively contain the contaminant plume and prevent off-site migration. The treatment of the onsite production wells and the off-site domestic wells will continue under the conditions specified by the ACO.

Alternate - 4.

This involves the installation of a soil vacuum extraction system in all three source areas of the east side, the Former Landfill, the Pit/Trench Disposal Area, and the former Evaporation system area. It is expected this system would take approximately 24 months to remediate the soils to the 100 ppb level for leachable VOCs. The pumping of the Bendix production wells would effectively contain the contaminant plume and prevent off-site migration. The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions specified by the ACO.

Alternate - 5.

This involves the aeration of the highly contaminated soils from the former landfill Area, Pit Disposal Area, and the Evaporation System Area. Highly contaminated soils are those soils that contain VOCs in the ppm range. Soil aeration involves the excavation of the contaminated soils above the leachable VOC 100 ppb level for processing through a mechanical sieve where the soils are disaggregated, facilitating the release of VOCs from the soil matrix. The soils are passed through the process until they are reduced to the 100 ppb level for leachable VOCs. A soil vacuum extraction system would be installed in the less contaminated areas (100 ppb - 1 ppm range). It is expected this system would take approximately 24 months to remediate the soils to the 100 ppb level for leachable VOCs. The pumping of the Bendix production wells would effectively contain the contaminant plume and present off-site migration. The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions of the ACO. The proposed remedial alternatives provide complete protection, in the short-term, to the groundwater users by treatment of the water at the individual wells. Longterm effectiveness is provided by the installation of facilities to remove VOCs from the ground water and soils.

B. West Side

Remediation alternatives for the West Side are targeted at the following objectives:

1. Recovery of contaminated groundwater in the shallow flow zone originating from the TCE Tank Area.
2. Prevention of further migration of contaminants from the TCE Tank Area into the groundwater system.
3. Prevention of discharge of contaminants to surface waters through the existing parking lot storm drain.

Summary of Alternatives

Table 3 summarizes the alternatives according to the applicable assessment factors for the west side, the following is a more detailed explanation of the remedial measures. See Appendix A for explanation of soil treatment limit of 100 ppb leachable VOCs.

Alternative - 1.

No remediation of the sources or the contaminated groundwater is undertaken. Restrictions concerning the use of the site and the groundwater are entered into the property deed. Only monitoring of the groundwater is conducted to track the extent and movement of the contamination.

Alternative - 2.

This involves the installation of a soil vacuum extraction system in the area of the TCE Tank and the Former Drum Storage Area to remove the VOCs from these sources. It is expected that this system can remediate the contaminated soils to the 100 ppb level for leachable VOCs within 2-5 years. A groundwater recovery trench would be installed to intercept the shallow contaminant plume. This trench would be located at the eastern edge of the parking lot. The recovered contaminated groundwater can be treated by conventional air stripping or in the Bendix facilities existing carbon adsorption system. The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions specified by the Administrative Consent Order (ACO).

Alternative - 3.

This involves the installation of a soil vacuum extraction system in the weathered till from the TCE tank area to the eastern edge of the parking lot. The saturated weathered till would be dewatered prior to installation of the system. It is expected that this system can remediate the contaminated soils to the 100 ppb level for leachable VOCs within 2-5 years. The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions specified by the ACO.

Alternative - 4.

This involves the installation of a groundwater recovery trench to intercept the shallow contaminant plume. The trench would be located at the eastern edge of the parking lot. The recovered contaminated groundwater can be treated by conventional air stripping or in the Bendix facility's existing carbon adsorption system. A multimedia cap or asphalt pavement would be placed from the TCE tank area to the parking lot to eliminate recharge to the shallow flow zone and lower the water table. It is expected that this system can remediate the groundwater to <1 ppb for leachable VOCs from 11 to 30 years.

The treatment of the on-site production wells and the off-site domestic wells will continue under the conditions specified by the ACO.

IX. A. Description of Major ARARs

Federal

SDWA - MCLS

CWA - Ambient Water Quality Criteria

RCRA - Closure Requirements

State

Pennsylvania Clean Streams Law Section 402	- Water Soil Clean-up Standards
Pennsylvania Solid Waste Management Act Section 501	- Soil Clean-up Standards
Pennsylvania Air Pollution Control Act	- Ambient Air Quality Standards

B. Additional Requirements for Protectiveness

The selected site remedy must consider and be consistent with the following:

Federal Executive Order 11988, Protection of Floodplains 40 CFR 6, Appendix A	- Action to advoid adverse effects, minimize potential harm, restore and preserve natural and beneficial value.
Federal Executive Order 11990 Protection of Wetlands, 40 CFR 6, Appendix A	- Action to minimize destruction, loss or degradation of wetlands.
Federal Clean Water Act	- Differential Groundwater Policy Class II A aquifer
RCRA	- Land Ban Disposal Restrictions

X. Comparative Analysis

A. East Side Alternatives (See Table 2)

Alternative - 1. No action with continuation of groundwater monitoring.

No environmental or public health benefits would result from implementing this alternative. The reduction of existing and future health risks by preventing continued exposure to contaminated groundwater would not be addressed. TCE and vinyl chloride occurs in 19 residential wells at a concentration of 1-30 ppb. Contaminated soil on site which acts as a continuing source of groundwater contamination remains. Groundwater monitoring will track plume movement, but will not remediate contamination. There will be no reduction of toxicity, mobility, or volume, since no treatment is employed. Site specific ARARs will not be complied with. The Present Worth of this Alternative is $770,000.

Alternative - 2. Soil Aeration; Groundwater Recovery Treatment

Soil Aeration system would take 6 months for design and construction. The system would be operated for 24 months. Groundwater collection and treatment is presently taking place with the existing production wells. VOC's are being removed through the carbon treatment system prior to discharge to surface waters.

TABLE 2

EAST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternate 1 -- No Action	Alternative 2 -- Soil Aeration; Ground Water Recovery/Treatment	Alternative 3 -- Off site Disposal, Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 4 -- Vacuum Extraction Ground Water Recovery/Treatment	Alternative 5 -- Soil Aeration, Vacuum Extraction, Ground Water Recovery/Treatment
	Deed restrictions to prevent on-site development/use on site and off site use of contaminated ground water; on going monitoring.	Excavation, on-site aeration and replacement of soils from the landfill/pit/trench/ distillation areas. Treat soils to 100 ppb level. Pump and treat ground water to prevent off site migration; on going monitoring. Treatment of off-site domestic supply wells.	Excavate and remove for off site disposal 240 cubic yards from the landfill and 400 cubic yards from the pit; install soil vapor extraction system in distillation and trench area; treat soil of 100 ppb level; pump and treat ground water to prevent off site migration; on going monitoring. Treatment of off site domestic supply wells.	Install vapor extraction system in landfill/pit/trench/ distillation areas. Treat soils to 100 ppb level, pump and treat ground water to prevent off site migration, on going monitoring. Treatment of off site domestic supply wells.	Excavation, aeration and replacement of highly contaminated soils from the landfill/pit/distillation areas; install vapor extraction system in all other less contaminated areas; pump and treat ground water to prevent off site migration; on going monitoring. Treatment of off-site wells.
Short-term Effectiveness					
- Time until protection is achieved (after ROD signing)	No risk from direct contact; risk from ground water ingestion remains.	Soil aeration system would take 6 months for design and construction. The system would be operated for 24 months. Ground water collection and treatment is presently taking place with the existing production wells. VOC's are being removed through the carbon treatment system prior to discharge to surface waters. Pumping time of 20-40 years is expected to reach compliance with the ACO.	Soil vapor extraction system would take 8 months for pilot testing, design, and construction. The system would be operated for 24 months. Contaminated soils from the landfill and the pit would be removed and disposed off site within 8 months. Ground water component same as Alternative 2.	Soil vapor extraction system would take 8 months for pilot testing, design, and construction. The sytem would be operated for 24 months. Ground water collection and treatment is presently taking place with the existing production wells. VOC's are being removed through the carbon treatment system. Pumping time of 20-40 years is expected to reach compliance with ACO.	Soil aeration system would take 5 months for design and construction. The system would be operated for 4 months. Soil vapor extraction system would take 8 months for pilot testing, design, and construction. The system would be operated for 2 years. Ground water collection and treatment is presently taking place with the existing production wells. VOC's are being removed through the carbon treatment system. Pumping time of 20 40 years is expected to reach compliance with ACO.
- Protection of community during remedial actions	No adverse affect on community. Risk are long term.	Significant increase in fugitive emissions during soil aeration process.	Significant increase in fugitive emissions during excavation. Air impacts from vapor extraction system mitigated by emission control system.	Air impacts from vapor extraction will be mitigated by emissions control system.	Significant increase in fugitive emissions during soil aeration process. Air impacts from vapor extraction will be mitigated by emissions control system.
- Protection of workers during remedial actions	No adverse affect on workers.	Protection of workers required against inhalation of dusts and vapors during operation of soil aeration process. On site worker protection provided through carbon treatment of on site potable water.	Protection required against inhalation of dust or vapors during installation and operation of soil vapor extraction system. On site worker protection provided through carbon treatment of on site potable water.	Protection required against inhalation of dust or vapors during installation, and operation of soil vapor extraction system	Protection of workers required against inhalation of dusts and vapors during operation of soil aeration process and vapor extraction

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TABLE 2

EAST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternate 1 -- No Action	Alternative 2 -- Soil Aeration, Ground Water Recovery/Treatment	Alternative 3 -- Off site Disposal, Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 4 -- Vacuum Extraction Ground Water Recovery/Treatment	Alternative 5 -- Soil Aeration, Vacuum Extraction, Ground Water Recovery/Treatment
- Environmental Impact	No adverse environmental impact.	Aquifer drawdown during ground water recovery and treatment; air impacts from soil aeration process.	Aquifer drawdown during ground water recovery and treatment; Minor air impacts from excavation and construction and operation of vapor extraction system. Immediate mitigation of 2 highly contaminated source areas (land fill and pit). Aquifer drawdown during ground water recovery and treatment.	Aquifer drawdown during ground water recovery and treatment, minor air impacts from soil vapor extraction system.	Aquifer drawdown during ground water recovery and treatment; minor air impacts from soil aeration process and soil vapor extraction system.
Long-term Effectiveness and Permanence					
- Magnitude of residual risk	Risk remains from ground water contamination of TCE and vinyl chloride on site. TCE and vinyl chloride occurs in 18 residential wells at a concentration of 1 - 28 ppb. Contaminated soil on site which acts as a continuing source of ground water contamination. Remains at 4.8 x 10-4 cancer risk.	Treatment of soil and ground water significantly reduces residual site risk. Reduced potential for human exposure to soil and/or contaminated migration of ground water. Ground water will have <1 ppb of TCE, which is expected to be achieved in 20-40 years.	Removal of contaminated soil off site from landfill and pit immediately mitigates highly contaminated sources. Treatment of soils in distillation and trench area significantly reduces residual site risk-leachable residual VOCs in soil 100 ppb. Reduced potential for human exposure to soil and/or contaminated ground water. Ground water will have <1 ppb of TCE. Which is expected to be achieved in 20-40 years.	Treatment of soil and ground water significantly reduces residual site risk. Reduced potential for human exposure to soil and/or contaminant migration to ground water. Ground water will have <1 ppb TCE, which is expected to be achieved in 20-40 years.	Treatment of soil and ground water significantly reduces residual site risk. Reduced potential for human exposure to soil and/or contaminant migration to ground water. Ground water will have <1 ppb TCE, which is expected to be achieved in 20-40 years.
- Adequacy of controls	No direct engineering controls to prevent exposure to contaminated soil and ground water. Ground water monitoring will track plume movement, but will not remediate contamination.	Soil aeration will significantly reduce contaminants in soil; ground water on site and off site will be restored to drinkable quality.	Significant sources of contamination removed; vapor extraction will significantly reduce contaminants in soil; on site and off site treatment of ground water eliminated human and environmental exposure.	Vapor extraction will significantly reduce contaminants in soil, ground water on site and off site will be restored to drinkable quality.	Vapor extraction and soil aeration will significantly reduce contaminants in soil, ground water on site and off site will be restored to drinkable quality.
- Reliability of Controls	High level of residual risk; Ground water contamination continues.	Soil aeration highly reliable due to removal of material causing risk; reliability of ground water containment and recovery has already been shown by monitoring and pump test.	Remedy is highly reliable due to removal of material posing a risk; vapor extraction technology has been demonstrated at sites with similar conditions; ground water treatment is a proven method of eliminating VOC's from drinking water.	Vapor extraction expected to be reliable, need testing to verify performance; reliability of ground water containment and recovery has already been shown by monitoring and pump test.	Remedy is highly reliable due to removal of material posing a risk; vapor extraction technology has been demonstrated at sites with similar conditions; ground water treatment is a proven method of eliminating VOC's from drinking water.

TABLE 2

EAST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternate 1 – No Action	Alternative 2 – Soil Aeration, Ground Water Recovery/Treatment	Alternative 3 – Off site Disposal, Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 4 – Vacuum Extraction Ground Water Recovery/Treatment	Alternative 5 – Soil Aeration, Vacuum Extraction, Ground Water Recovery/Treatment
Reduction of Toxicity, Mobility or Volume	No reduction of toxicity, mobility, or volume, since no treatment employed.	Toxicity and volume of contaminants in soil significantly reduced by aeration process soils reduced to 100 ppb leachable. Ground water contamination completely remediated by soil aeration process to <1 ppb TCE.	Significant portions of contaminated soils disposed off site; volume and toxicity of soil and water contamination almost completely remediated by vapor extraction; ground water reduces to <1 ppb TCE by activated carbon treatment.	Toxicity and volume of contaminants in soil significantly reduced by treatment; ground water containment completely remediated to < 1ppb TCE.	Toxicity and volume of contaminants in soil significantly reduced by aeration and vapor extraction in process. Ground water contamination completely remediated by soil aeration process to <1 ppb TCE.
		Ground water on site and off site completely remediated by carbon treatment system.	Ground water on site and off site completely remediated by carbon treatment system.	Ground water on site and off site completely remediated by carbon treatment system.	Ground water on site and off site completely remediated by carbon treatment system.
Implementability					
· Technical feasibility	Ground water monitoring easy to implement; ground water plume remains stable.	Soil aeration process implementable, equipment readily available from construction industry. The technology has been demonstrated at sites with similar conditions. Ground water recovery and treatment has been demonstrated many times.	Excavation of off site disposal is easy to implement, soil vapor extraction relatively easy to implement, requires some specialized equipment and specialist for start up; ground water recovery and treatment is a proven technology.	Soil vapor extraction relatively easy to implement, requires some specialized equipment and specialist for start up; the technology has been demonstrated at sites with similar conditions. Ground water as described in Alternate 3.	Vapor extraction and soil aeration process easy to implement, equipment readily available from construction industry. The technology has been demonstrated at sites with similar conditions. Ground water recovery and treatment has been demonstrated many times.
· Administrative feasibility	No off site construction; therefore no permits required for on-site remediation	Air permit from state required; no other permits required for on-site remediation.	Air permit from state required; no other permits required for on-site remediation.	Air permit from state required; no other permits required for on-site remediation	Air permit from state required; no other permits required for on-site remediation.
· Availability of services and materials	Services for ground water monitoring are currently available.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.
Cost					
· Capital cost	- 0 -	$2,636,000	$1,807,000	$1,363,000	$1,210,000
· O & M	$50,000	$80,000	$298,000	$208,000	$231,000
· Present Worth *	$770,000	$3,405,000 (a)	$3,040,000 (b)	$2,593,000 (b)	$2,316,000 (b)

Pumping time of 20 to 40 years is expected. Significant increase in fugitive emissions during soil aeration process is expected. Protection of workers required against inhalation of dusts and vapors during operation of soil aeration process. In addition, ambient air monitoring throughout the the site will take place. Potable water will be treated by carbon filtration. Environmental impacts anticipated during remediation are aquifer drawdown during groundwater recovery and treatment and air impacts from soil aeration process.

Treatment of soil and groundwater significantly reduces residual site risk thereby reducing the potential for human exposure to soil and/or contaminated migration of groundwater. Groundwater will have <1 ppb of TCE which is expected to be achieved. Soil aeration will significantly reduce contaminants in soil, and groundwater on-site and off-site will be restored to drinkable quality. Soil aeration is highly reliable due to removal of material causing risk. Reliability of groundwater containment and recovery has already been shown by monitoring and pump tests. Toxicity and volume of contaminants in soil are significantly reduced by the aeration process. This alternative is technically implementable. Site specific ARARs will be complied with. Risk to human health and the environment will be significantly reduced by described soil and groundwater treatment. The The Present Worth of this Alternative is $3,405,000.

Alternative - 3. Off-site Disposal of Soil, Vacuum Extraction, Groundwater Recovery/ Treatment

Soil vapor extraction system would take 8 months for pilot testing, design and construction. This system would be operated for 24 months. Contaminated soils from the landfill and pit areas would be removed and disposed off-site over an 8 months period. Groundwater collection and treatment is expected to be completed within 20-40 years. Significant increase in fugitive emissions during excavation is expected. Air impacts from vapor extraction system will be mitigated by emission control system. Environmental impacts anticipated are aquifer drawdown during groundwater recovery and treatment, air impacts from excavation and construction and operation of vapor extraction system, and immediate mitigation of 2 highly contaminated source areas.

Removal of contaminated soil off-site from landfill and pit areas immediately mitigates highly contaminated sources. Treatment of soils in other areas significantly reduces residual, leachable VOCs in soil. Reduction in potential for human exposure to soil and/or contaminated groundwater will be accomplished. Groundwater remediation is expected to be achieved in 20-40 years. Volume and toxicity of soil and water contamination will be remediated by vapor extraction. Groundwater contamination will be reduced by activated carbon treatment. Remediation technologies identified in this alternative are implementable. All site-specific ARARs will be met. The Present Worth of this Alternative is $3,040,000.

Alternative - 4. Vacuum Extraction, Groundwater Recovery/Treatment

Soil vapor extraction system would take 8 months for pilot testing, design and construction. The system would be operated for 24 months. Groundwater collection and treatment is presently taking place with the existing production wells. VOCs are being removed through the carbon treatment system. Pumping time of 20-40 years is expected. Air impacts from vapor extraction will be mitigated by emissions control system. Protection is against inhalation of dust or vapors during installation, and operation of soil vapor extraction system will be required. Environmental impacts anticipated are aquifer drawdown during groundwater recovery and treatment and air impacts from soil vapor extraction system.

The treatment of soil and groundwater significantly reduces residual site risk. Reduced potential for human exposure to soil and/or contaminant migration to groundwater is accomplished. Toxicity and volume of contaminants in soil significantly reduced by treatment. Groundwater on-site and off-site is remediated by carbon filtration. All technologies identified in this alternative are implementable. All site specific ARARs will be met. The Present Worth of this Alternative is $2,593,000.

Alternative - 5. Soil Aeration, Vacuum Extraction, Groundwater Recovery/Treatment

The soil aeration system would take 5 months for design and construction. The system would be operated for 4 months. The soil vapor extraction system would take 8 months for pilot testing, design, and construction. The system would be operated for 2 years. Groundwater collection and treatment is presently taking place with the existing production wells. VOC's are being removed through the carbon treatment system. Pumping time of 20-40 years is expected.

Significant increase in fugitive emissions during soil aeration process is anticipated. Air impacts from vapor extraction will be mitigated by emissions control system. Environmental impacts expected are aquifer drawdown during groundwater recovery and treatment and air impacts from soil aeration process and soil vapor extraction system. Treatment of soil and groundwater significantly reduces residual site risk. Reduced potential for human exposure to soil and/or contaminant migration to groundwater. Toxicity and volume of contaminants in soil significantly reduced by aeration and vapor extraction process. Groundwater contamination remediated by soil aeration. Technologies identified in this alternative are implementable. All site specific ARARs will be met. The Present Worth of this Alternative is $2,315,000.

B. West Side (See Table 3)

Alternative - 1. No-Action with continued monitoring

No environmental or public health benefits would result from implementing this Alternative. The reduction of existing or future health risks by preventing continued exposure would not be addressed. The contaminants would remain mobile and would continue to contaminate area groundwater. This alternative presents no additional adverse environmental impact.

Risks remains from groundwater contamination of TCE on site. TCE is projected to occur in 19 residential wells at a concentration of 1-30 ppb. Contaminated soil on site acts as a continuing source of groundwater contamination. There is no reduction of toxicity, mobility, or volume, since no treatment is employed. Groundwater monitoring will continue to be implemented.

TABLE 3

WEST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternative 1 -- No Action	Alternative 2 -- Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 3 Vacuum Extraction, Ground Water Supply Treatment	Alternative 4 -- Ground Water Recovery/Treatment, Capping
	Deed restrictions to prevent on-site development/use; on site and off site use of contaminated ground water; on going monitoring.	Install vapor extraction system in TCE tank area. Treat soils to 100 ppb level. Install ground water recovery trench in parking lot and treat by air stripping or with facility's carbon absorption system; on going monitoring. Treatment at off-site domestic supply wells.	Install vapor extraction system between parking lot and TCE tank area. Treatment at off-site domestic supply wells.	Install ground water recovery trench in parking lot and treat by air stripping, or with facility's carbon absorption system; place multimedia cap from TCE tank area to parking lot; on going monitoring. Treatment at off-site domestic wells.
Short-term Effectiveness				
- Time until protection is achieved (after ROD signing)	Direct contact is not applicable; risk from ground water ingestion remains.	Soil vapor extraction system would take 10 months for pilot testing, design, and construction. The system would be operated for 2-5 years. Ground water recovery trench would take up to 12 months for pilot testing, design, and construction. Pumping time of 11 to 30years would be required to reach < 1 ppb TCE in ground water.	Soil vapor extraction system would take 8 months for pilot testing, design, and construction. The system would be operated for 2-5 years. Ground water recovery would take 11 to 30 years to reach <1 ppb TCE in ground water.	The ground water recovery trench would take up to 12 months for pilot testing, design and construction. Cap construction would take 4 months. Ground water recovery would take 11to 30 years. To reach < 1 ppb TCE in ground water.
- Protection of community during remedial actions	No adverse affect on community.	Slight increase in dust during excavation and construction of soil vapor extraction system. and ground water recovery trench.	Slight increase in dust during excavation and construction of ground water recovery trench.	Slight increase in dust during construction of ground water recovery trench. Increase in dust during cap construction.
- Protection of workers during remedial actions	No adverse affect on workers.	Protection required against inhalation of dust or vapors during installation, and operation of soil vapor extraction system.	Protection required against inhalation dust or vapors during installation and operation of ground water recovery system.	Protection required against inhalation of dust or vapors during installation, and operation of ground water recovery system and capping construction.

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TABLE 3

WEST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternative 1 -- No Action	Alternative 2 -- Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 3 Vacuum Extraction, Ground Water Supply Treatment	Alternative 4 -- Ground Water Recovery/Treatment, Capping
- Environmental Impact	No adverse environmental impact.	Minor air impacts from soil vapor extraction system; drawdown of aquifer under parking lot during ground water extraction and treatment	Minor air impacts from air stripping system.	Aquifer drawdown during ground water recovery and treatment, minor air impacts from air stripping system.
Long-term Effectiveness and Permanence				
- Magnitude of residual risk	Risk remains from groundwater contamination of TCE on site. TCE are projected to occur in 10 residential wells at a concentration of 1 - 30 ppb. Contaminated soil off site acts as a continuing source of ground water contamination. Remains at 3.5 x 10-6 cancer risk.	Treatment of soil and ground water significantly reduces residual site risk. Treat soils to 100 ppb level; Reduced potential for human exposure to soil and/or contaminated migration of ground water. Ground water will have <1 ppb of TCE. Monitoring off site precludes potential of unauthorized use of contaminated water.	Treatment of soil and ground water significantly reduces residual site risk. Treat soils to 100 ppb level, Reduced potential for human exposure migration of ground water. Ground water will have <1 ppb of TCE. Monitoring off site precludes potential of unauthorized use of contaminated water.	Treatment of soil and ground water significantly reduces residual site risk. Treat soils to 100 ppb level, Reduced potential for human exposure to soil and/or contaminated migration of ground water. Ground water will have <1 ppb of TCE. Monitoring off site precludes potential of unauthorized use of contaminated water.
- Adequacy of controls	No direct engineering controls to prevent exposure to contaminated soil and ground water. Ground water monitoring will track plume movement, but will not remediate contamination.	Vapor extraction will significantly reduce contaminants in soil; ground water on site and off site will be restored to comply with ACO. Ground water monitoring will track plume movement.	Ground water recovery system significantly reduces contaminantes in soil. Ground water monitoring will verify effectiveness of system.	Ground water recovery system significantly reduces contaminantes in soil. Ground water monitoring will verify effectiveness of system.

TABLE 3

WEST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternative 1 -- No Action	Alternative 2 -- Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 3 Vacuum Extraction, Ground Water Supply Treatment	Alternative 4 -- Ground Water Recovery/Treatment, Capping
- Reliability of Controls	Residual risk remains. Ground water contamination continues.	Vapor extraction method carriers good potential reliability reliable, need testing to verify performance. Ground water recovery method needs tests to verify performance. Treatment of ground water is a proven method of eliminating VOC's from ground water.	Ground water recovery method reliable, need testing to verify effectiveness.	Ground water recovery method reliable, need testing to verify effectiveness.
Reduction of Toxicity, Mobility or Volume	No reduction of toxicity, mobility, or volume, since no treatment employed.	Toxicity and volume of contaminants in soil significantly reduced by treatment; Ground water contamination is reduced. Ground water on site and off-site completely remediated by carbon treatment system.	Toxicity and volume of contaminants in soil significantly reduced by treatment; Ground water contamination is reduced.	Toxicity and volume of contaminants in soil significantly reduced by treatment; Ground water contamination is reduced.
Implementability				
- Technical feasibility	Ground water monitoring easy to implement; ground water plume remains static.	Soil vapor extraction implementable; requires some specialized equipment and specialist for start up; the technology has been demonstrated at sites with similar conditions. Ground water recovery and treatment is a proven technology.	Ground water recovery system; technology has been demonstrated at other sites.	Ground water recovery system and cap; technology has been demonstrated at other sites.

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TABLE 3

WEST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternative 1 – No Action	Alternative 2 – Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 3 Vacuum Extraction, Ground Water Supply Treatment	Alternative 4 – Ground Water Recovery/Treatment, Capping
- Administrative feasibility	No off site construction; therefore no permits required for on-site remediation	Air permit from state required for vapor extraction system; discharge permit may be required for treated ground water; no other permits required for on-site remediation	Air permit from state required for vapor extraction system; discharge permit may be required for treated ground water; no other permits required. for on-site remediation	Air permit from state required for vapor extraction system; discharge permit may be required for treated ground water; no other permits required. for on-site remediation
- Availability of services and materials	Services for ground water monitoring are currently available.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.	Services and materials available. Due to potential patent restraints on vacuum extraction, limitations may occur.	Services and materials readily available.
Cost		Air Stripping | Carbon Adsorption		
- Capital cost	- 0 -	$1,190,000 | $1,054,000	$1,580,000	$1,104,000
- O & M	$50,000	$163,000 | $148,000	$238,000	$91,000
- Present Worth*	$770,000	$2,172,000(a) | $1,911,000 (a)	$2,611,000 (c)	$2,030,000
Compliance with ARARs				
- Compliance with ARARs	MCLs in ground water would not be attained.	All ARARs will be met.	All ARARs will be met.	All ARARs will be met.
- Appropriateness of waivers	Not justifiable.	Not applicable	Not applicable	Not applicable
- Compliance with criteria, advisories, and guidance	Does not meet requirements of administrative consent order.	Complies with state and local criteria and federal advisories.	Complies with state and local criteria and federal advisories.	Complies with state and local criteria and federal advisories.

TABLE 3

WEST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternative 1 -- No Action	Alternative 2 -- Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 3 Vacuum Extraction, Ground Water Supply Treatment	Alternative 4 -- Ground Water Recovery/Treatment, Capping
Overall Protection of Human Health and the Environment				
- How risks are eliminated, reduced, or controlled	Risk to human health from ingestion of contaminated ground water is not controlled. Environmental degradation will continue as leaching from on site soils continues.	Risk of direct contact with contaminated soils and dust significantly reduced by in situ treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment; risk to human health and the environment significantly reduced by ground water recovery and treatment.	Risk of direct contact with contaminated soils and dust significantly reduced by in situ treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment, risk to human health and the environment significantly reduced by ground water recovery and treatment.	Risk of direct contact with contaminated soils and dust significantly reduced by in situ treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment, risk to human health and the environment significantly reduced by ground water recovery and treatment.

- Calculated according to method outlined in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA:, Draft, March 1988

(a) n = 5 for vacuum extraction and dewatering, n = 11 for interceptor trench
(b) n = 30 for capping, n = 11 for interceptor trench
(c) n = 5 for vacuum extraction

Risk to human health and the environment will not be controlled. Environmental degradation will continue as leaching from on-site soils continues. Site-specific ARARs will not be met. The Present Worth of this Alternative is $770,000.

Alternative - 2. Vacuum Extraction, Groundwater Recovery/Treatment

Soil vapor extraction system would take 10 months for pilot testing, design, and construction. The system would be operated from 2-5 years. Groundwater recovery trench would take up to 12 months for pilot testing, design, and construction. Pumping time of 11 to 30 years would be required to remediate groundwater. Increase in dust expected during excavation and construction of soil vapor extraction system and groundwater recovery trench.

Environmental impacts anticipated are air impacts from soil vapor extraction system and drawdown of aquifer during groundwater extraction and treatment. Treatment of soil and groundwater significantly reduces residual site risk. Reduction in potential for human exposure to soil and/or continued migration of groundwater will result from implementation of this remedy. Monitoring off-site precludes potential of unauthorized use of contaminated water. Toxicity and volume of contaminants in soil and groundwater will be significantly reduced by treatment. All technologies identified in this alternative are implementable.

Risk of direct contact with contaminated soils and dust is significantly reduced by in-situ treatment of soils. Contaminant migration from on-site soils to groundwater significantly reduced by soil treatment, and risk to human health and the environment is significantly reduced by groundwater recovery and treatment. All site-specific ARARs will be met. The Present Worth of this Alternative is approximately $2,172,000.

Alternative - 3. Vacuum Extraction, Groundwater Supply Treatment

Soil vapor extraction system would take 8 months for pilot testing, design, and construction. The system would be operated for 2-5 years. Groundwater recovery would take 11-30 years. A slight increase in dust is anticipated during excavation and construction of groundwater recovery trench. Environmental impacts anticipated are air impacts from the air stripping system. The treatment of soil and groundwater significantly reduces residual site risk. There will be a reduced potential for human exposure due to migration of contaminants in groundwater. Monitoring groundwater offsite precludes potential of unauthorized use of contaminated water. The toxicity and volume of contaminants in soil and groundwater are significantly reduced by treatment. All technologies identified in this Alternative are implementable.

The risk of direct contact with contaminated soils and dust are significantly reduced by in-situ treatment of soils. Contaminant migration from on-site soils to groundwater is significantly reduced by soil treatment. The risk to human health and the environment is significantly reduced by groundwater recovery and treatment. All sitespecific ARARs will be met. The Present Worth for this Alternative is $2,611,000.

Alternative - 4. Groundwater Recovery/Treatment, Capping

The groundwater recovery trench would take up to 12 months for pilot testing; design and construction would take 4 months. Groundwater recovery would take 11-30 years. A slight increase in dust during the construction of a groundwater recovery trench and an increase in dust during cap construction are anticipated. The environmental impacts anticipated are aquifer drawdown during groundwater recovery and treatment and air impacts from the air stripping system. Treatment of soil and groundwater significantly reduces residual site risk. There is a reduction in the potential for human exposure to soil and/or continued migration of groundwater contamination. Monitoring off-site precludes potential of unauthorized use of contaminated water.

The toxicity and volume of contaminants in groundwater and soil significantly are reduced by treatment. All technologies identified in the alternative are implementable. The risk of direct contact with contaminated soils and dust are significantly reduced by in-situ treatment of soils. Contaminant migration from onsite soils to groundwater is significantly reduced by soil treatment. The risk to human health and the environment is significantly reduced by groundwater recovery and treatment. All site-specific ARARs will be met. The Present Worth of this alternative is $2,030,000.

XII. Selected Remedial Alternative

A. Description and Performance Goals

Section 121 of SARA and the current version of the National Contingency Plan (NCP) (50 Fed. Reg. 47912, November 20, 1985) establish a variety of requirements pertaining to remedial actions under CERCLA. Applying the current evaluation criteria in Table 1 to the four remaining remedial alternatives, we recommend that the following alternatives be implemented.

The cleanup goal for all the groundwater flow zones at this Site has been set at <1 ppb. This goal is consistent with the cleanup goals established in the December, 1987 COA negotiated between PADER and the Site PRPs.

West Site Area

The selected alternative is alternative number 2. This alternative includes vacuum extraction, groundwater supply treatment, and groundwater recovery/treatment.

East Site Area

The selected alternative is alternative number 5. This alternative includes vacuum extraction, soil aeration, groundwater supply treatment and groundwater recovery/treatment.

B. Statement of Findings Regarding Wetlands and Floodplain Management

All excavation and fill activities during the remedial action shall be conducted in a manner consistent with provisions of Appendix A of 40 CFR Part 6. The subject regulations have been entitled "Statement of Procedures On Floodplain Management And Wetlands Protection." These procedures constitute policy and guidance for carrying out provisions of Executive Order 11990 and 11988 respectively.

The Remedial Design o the Remedial Action shall be developed in a manner consistent with Appendix A of 40 CFR Part 6 to assure that potential harm and adverse effects to the wetlands is minimized. The Remedial Design has not yet been initiated at this time, therefore, specific steps to minimize impacts have not yet been identified. In addition, the effect of the Remedial Action on the wetlands cannot accurately be assessed at this time.

While all remedial measures shall be designed to minimize harm to wetlands, it is possible that some adverse effects may be unavoidable. Should remedial activity be expected to create such effects, restorative measures shall be developed during the Remedial Design. Should anticipated adverse effects occur, restorative measures shall be implemented as part of the Remedial Action.

Schedule

The anticipated schedule is to commence the remedial design by January, 1989.

XIII. The Statutory Determinations

A. Protection of Human Health and the Environment

The selected remedy will reduce, control, and eliminate the amount of VOCs leachating into the environment at this site and will ensure adequate protection of human health and the environment. No unacceptable short or long term risks or cross-media impact will be caused by implementation of the remedy.

B. 1. Attainment of ARARs

The selected remedy will attain the applicable or relevant and appropriate requirements and are as follows:

Federal	
SDWA	- MCLS
CWA	- Ambient Water Quality Criteria
RCRA	- Closure Requirements

State	
Pennsylvania Clean Streams Law Section 402	- Water Clean-up Standards
Pennsylvania Solid Waste Management Act Section 501	- Soil Clean-up Standards
Pennsylvania Air Pollution Control Act	- Ambient Air Quality Standards

2. Additional Requirements for Protectiveness

The selected site remedy must consider and be consistent with the following:

Federal Executive Order 11988, Protection of Floodplains 40 CFR 6, Appendix A	- Action to advoid adverse effects, minimize potential harm, restore and preserve natural and beneficial value.
Federal Executive Order 11990 Protection of Wetlands, 40 CFR 6, Appendix A	- Action to minimize destruction, loss, or degradation of wetlands.
Federal Clean Water Act	- Differential Groundwater Policy Class II A aquifer.
RCRA	- Land Ban Disposal Restrictions

C. Cost-effectiveness

The selected remedy provides overall effectiveness commensurate to its costs such that it represents a reasonable value for the money.

D. Utilization of permanent solutions employing alternative technologies to the maximum extent practicable

The selected remedy is the most appropriate solution for this operable unit and represents the maximum extent to which permanent solutions and treatment can be practicably utilized.

E. Preference for treatment as a principal element

The preference is satisfied since treatment of the principal threats were found to be practicable.

APPENDIX A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

DATE: SEP 22 1988

SUBJECT: Bendix ROD Clarification

FROM: Patricia M. Tan, (3HW17) Patricia M. Tan
Environmental Engineer

TO: Dave Crownover, Chief
Superfund Remedial Enforcement
Pennsylvania Department of Environmental Resources

Justification for Selecting 100ppb VOCs in soil as the Cleanup Goal

The February 4, 1985 Bendix Feasibility Study, which is referenced in the Supplemental Feasibility Study dated July 18, 1988, contains a discussion of the "100ppb" excavation/treatment limit. (Both the 1985 and 1988 reports comprise the Feasiibility Study for this site and are part of the Bendix Site's Administrative Record). The rationale is as follows:

The hydrogeologic study indicates that the vertical contaminant distribution from the shallow flow component to the top of the bedrock component in the bedrock flow system is approximately logarithmic. That is, each succeeding flow component contains approximately one order of magnitude lower volatile organic concentrations than the overlying component. At the Bendix Site, the Glacial Till Flow System, which overlies the Bedrock Flow System, is comprised of two components. which are referenced as the shallow compoment and the deep component. For example, under conditions of maximum contaminant migration, approximately 1,000 ppb mobile contaminants in the shallow component results in approximately 10 ppb in the bedrock flow system. Using this as a guide, approximately 100 ppb of mobile contaminants in the soils could ultimately result in 1 ppb in the bedrock system under maximum contaminant transmission conditions. This rationale was further explored in the literature and verified in field leaching studies performed during the pilot air-stripping program described in the report dated February, 1988.

The pilot air-stripping program focused on 5ppb as the cleanup goal for the groundwater at the Bendix Site. This goal is inconsistent with the COA that PADER negotiated with the Site PRPs. The COA set < 1 ppb as the goal for groundwater remediation at this site. This cleanup goal of <1 ppb for groundwater has been adopted in the ROD for this site.

APPENDIX B

Table 2-1
Synopsis of Samples Collected and Parameter(s) Analyzed for Bendix - South Montrose RI/FS

Sample Location	Sample matrix	Sample Type	Analytical Parameter PPL Volatile Organics	PPL Semi-Volatile Organics	Metals	PCBs
TCE Storage Area:						
ST-1	soil	grab	X	X	X	X
Solvent Evaporation Area:						
SE-1	soil	grab	X	X	X	X
Pit/Trench Disposal Area:						
SP-1	soil	grab	X			
SP-2	soil	grab	X			
SP-1+2	soil	composite		X	X	X
SP-3	soil	grab	X			
SP-4	soil	grab	X			
SP-3+4	soil	composite		X	X	X
Old Landfill Area:						
SL-1	soil	grab	X			
SL-2	soil	grab	X			
SL-1+2	soil	composite		X	X	X
Background Area:						
SB-1	soil	grab	X	X	X	X
SB-2	soil	grab	X	X	X	X
SS-1	sediment	grab	X			
	sediment	composite		X	X	X
MW-9	ground water	grab	X	X	X	X
B-1	ground water	grab	X	X	X	X
B-4	ground water	grab	X	X	X	X
B-5	ground water	grab	X	X	X	X
Pond 1	surface water	grab	X	X	X	X
Pond 2	surface water	grab	X	X	X	X
Parking lot	surface water	grab	X	X	X	X

Figure 2-4
Surface Water and Sediment Sampling Locations
Supplemental RI - 1988

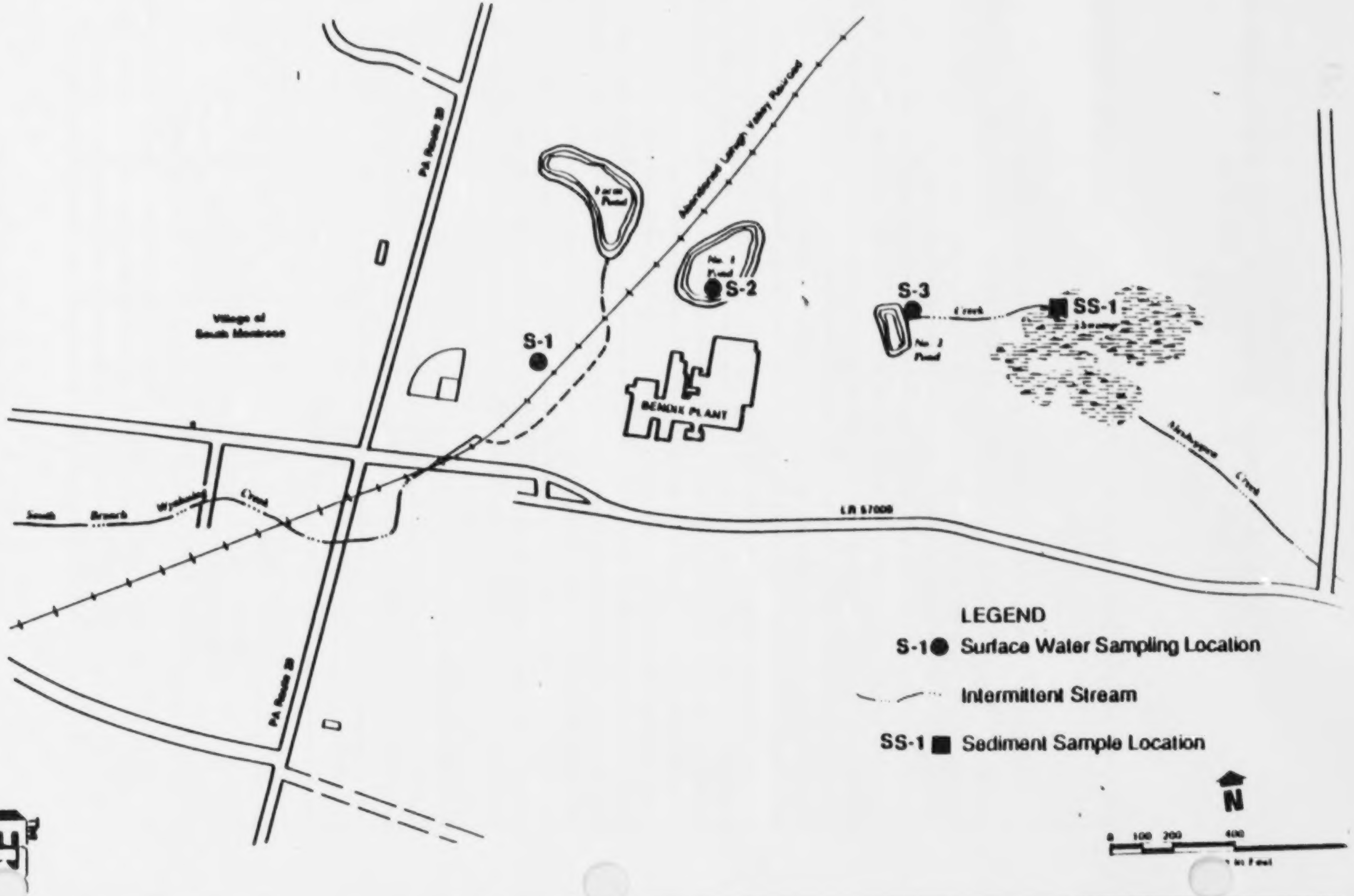

Village of South Montrose
PA Route 29
PA Route 29
Abandoned Lehigh Valley Railroad
Farm Pond
No. 1 Pond
No. 2 Pond
S-1
S-2
S-3
SS-1
Creek
Swamp
BENDIX PLANT
LR 57000
Meshoppen Creek
South Branch Wyalusing Creek
LEGEND
S-1 ● Surface Water Sampling Location
Intermittent Stream
SS-1 ■ Sediment Sample Location
N
0 100 200 400
Scale in Feet

Figure 2-1
Soil Boring Locations
Supplemental RI - 1988

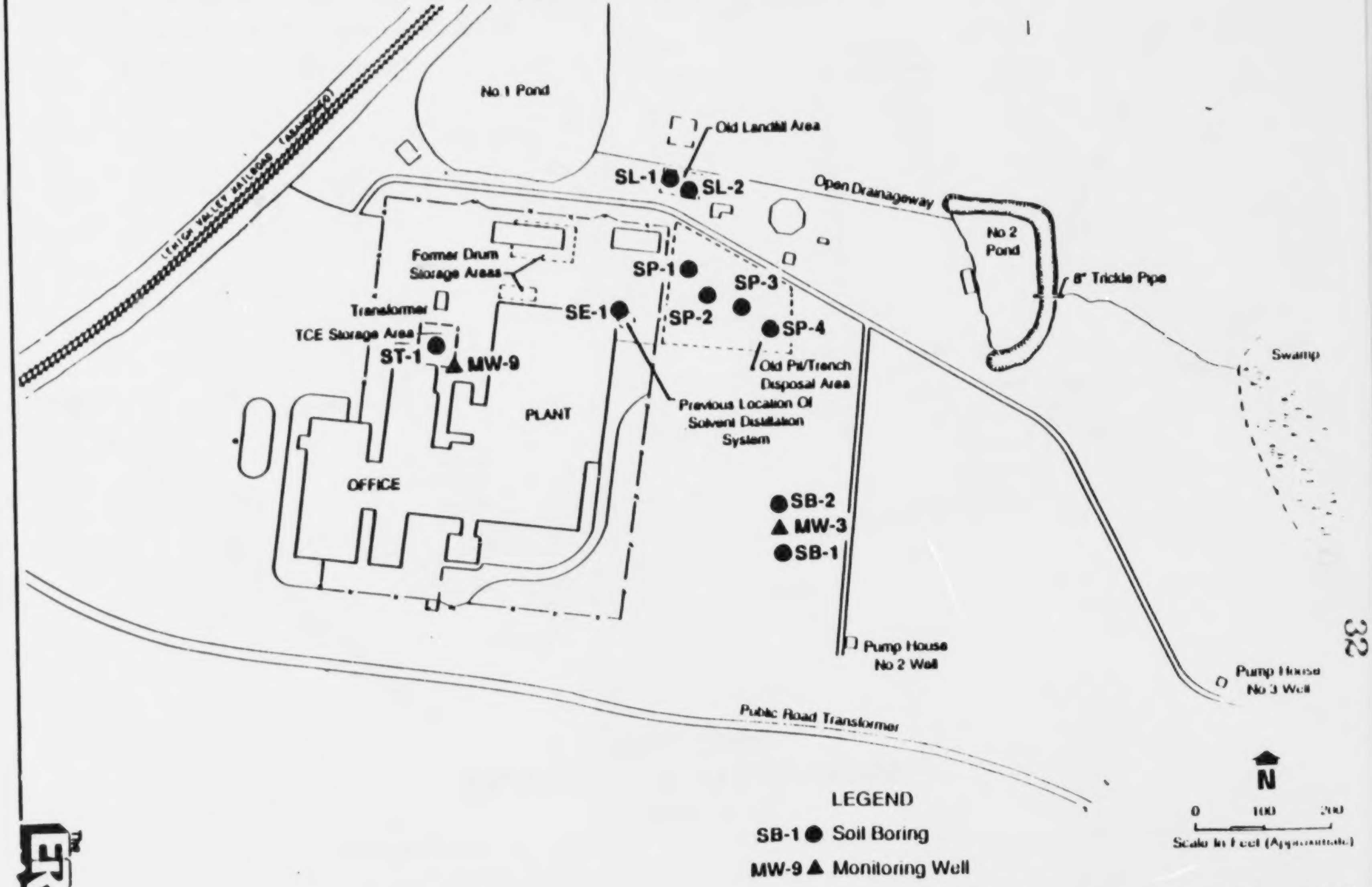

LEHIGH VALLEY RAILROAD (ABANDONED)
No 1 Pond
Old Landfill Area
SL-1
SL-2
Open Drainageway
No 2 Pond
8" Trickle Pipe
Swamp
Former Drum Storage Areas
Transformer
TCE Storage Area
ST-1
MW-9
SE-1
SP-1
SP-2
SP-3
SP-4
Old Pit/Trench Disposal Area
Previous Location Of Solvent Distillation System
PLANT
OFFICE
SB-2
MW-3
SB-1
Pump House No 2 Well
Pump House No 3 Well
Public Road Transformer
LEGEND
SB-1 ● Soil Boring
MW-9 ▲ Monitoring Well
N
0
100
200
Scale In Feet (Approximate)

Figure 1-4
Monitoring Well Locations
ERM - 1984

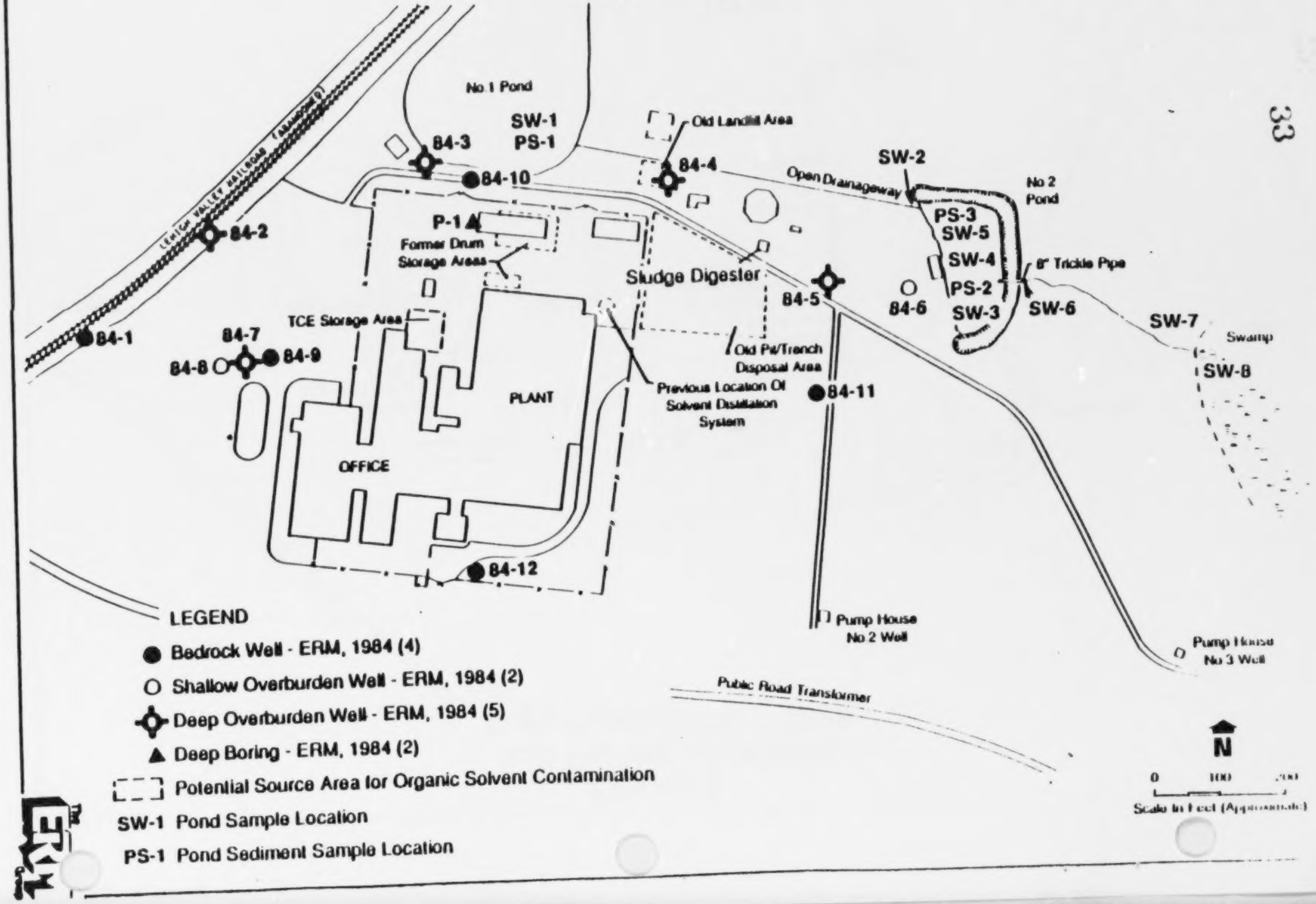

No 1 Pond
SW-1
PS-1
84-3
84-10
Old Landfill Area
84-4
Open Drainageway
SW-2
No 2 Pond
PS-3
SW-5
SW-4
PS-2
SW-3
8" Trickle Pipe
SW-6
SW-7
Swamp
SW-8
LEHIGH VALLEY RAILROAD
84-2
84-1
P-1
Former Drum Storage Areas
Sludge Digester
84-5
84-6
TCE Storage Area
84-7
84-8
84-9
PLANT
OFFICE
Old Pit/Trench Disposal Area
Previous Location Of Solvent Distillation System
84-11
84-12
Pump House No 2 Well
Pump House No 3 Well
Public Road Transformer
N
0
100
200
Scale In Feet (Approximate)
LEGEND
● Bedrock Well - ERM, 1984 (4)
○ Shallow Overburden Well - ERM, 1984 (2)
Deep Overburden Well - ERM, 1984 (5)
▲ Deep Boring - ERM, 1984 (2)
Potential Source Area for Organic Solvent Contamination
SW-1 Pond Sample Location
PS-1 Pond Sediment Sample Location

Figure 2-5
Phase I Monitoring Well Installation Locations

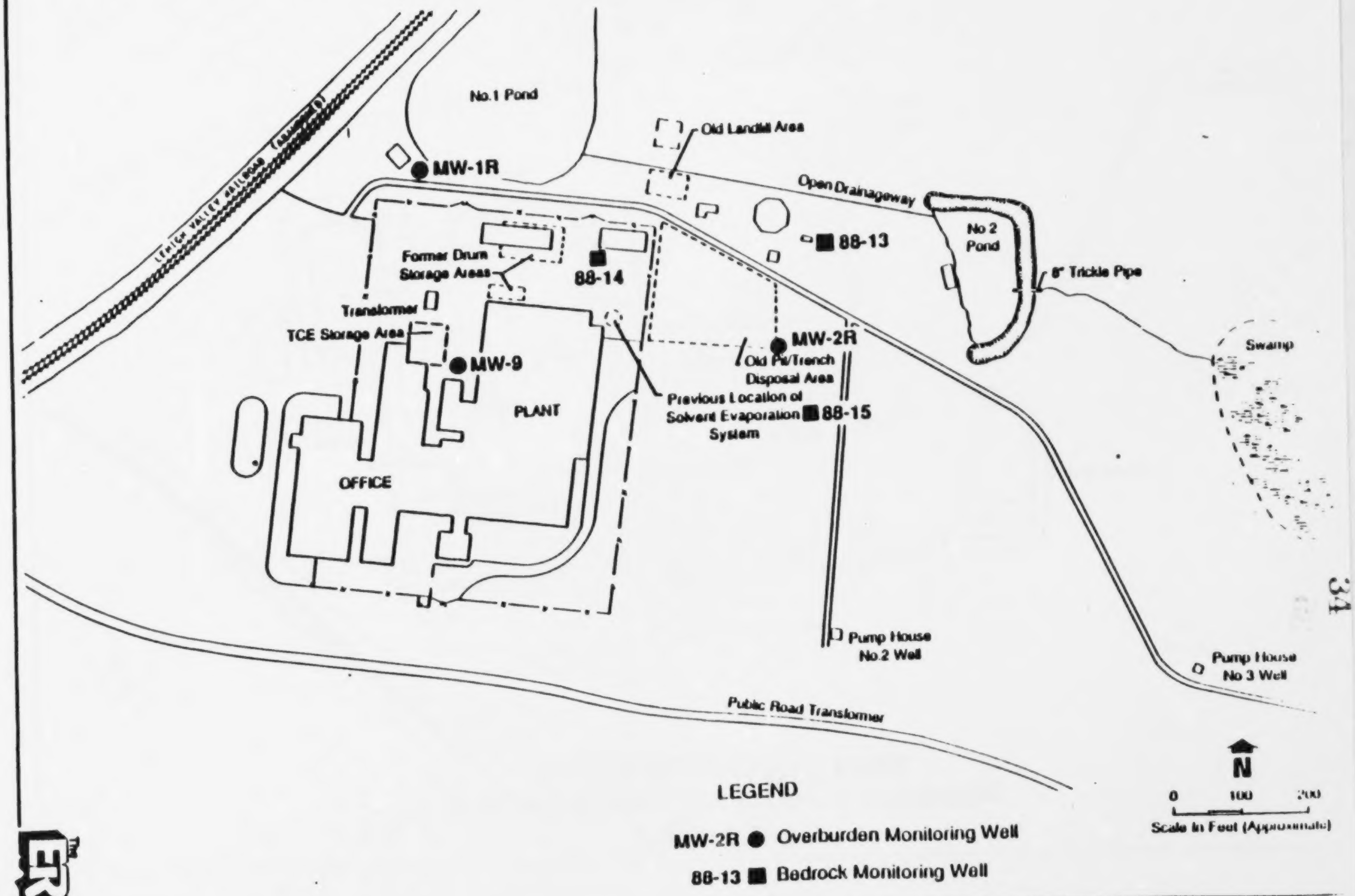

LEHIGH VALLEY RAILROAD
No.1 Pond
MW-1R
Old Landfill Area
Open Drainageway
No 2 Pond
8" Trickle Pipe
Swamp
88-13
Former Drum Storage Areas
88-14
Transformer
TCE Storage Area
MW-9
PLANT
OFFICE
MW-2R
Old Pit/Trench Disposal Area
Previous Location of Solvent Evaporation System
88-15
Pump House No.2 Well
Pump House No 3 Well
Public Road Transformer
LEGEND
MW-2R ● Overburden Monitoring Well
88-13 ■ Bedrock Monitoring Well
N
0
100
200
Scale in Feet (Approximate)

Figure 2-2
Ground Water Sampling Locations
Supplemental RI - 1988

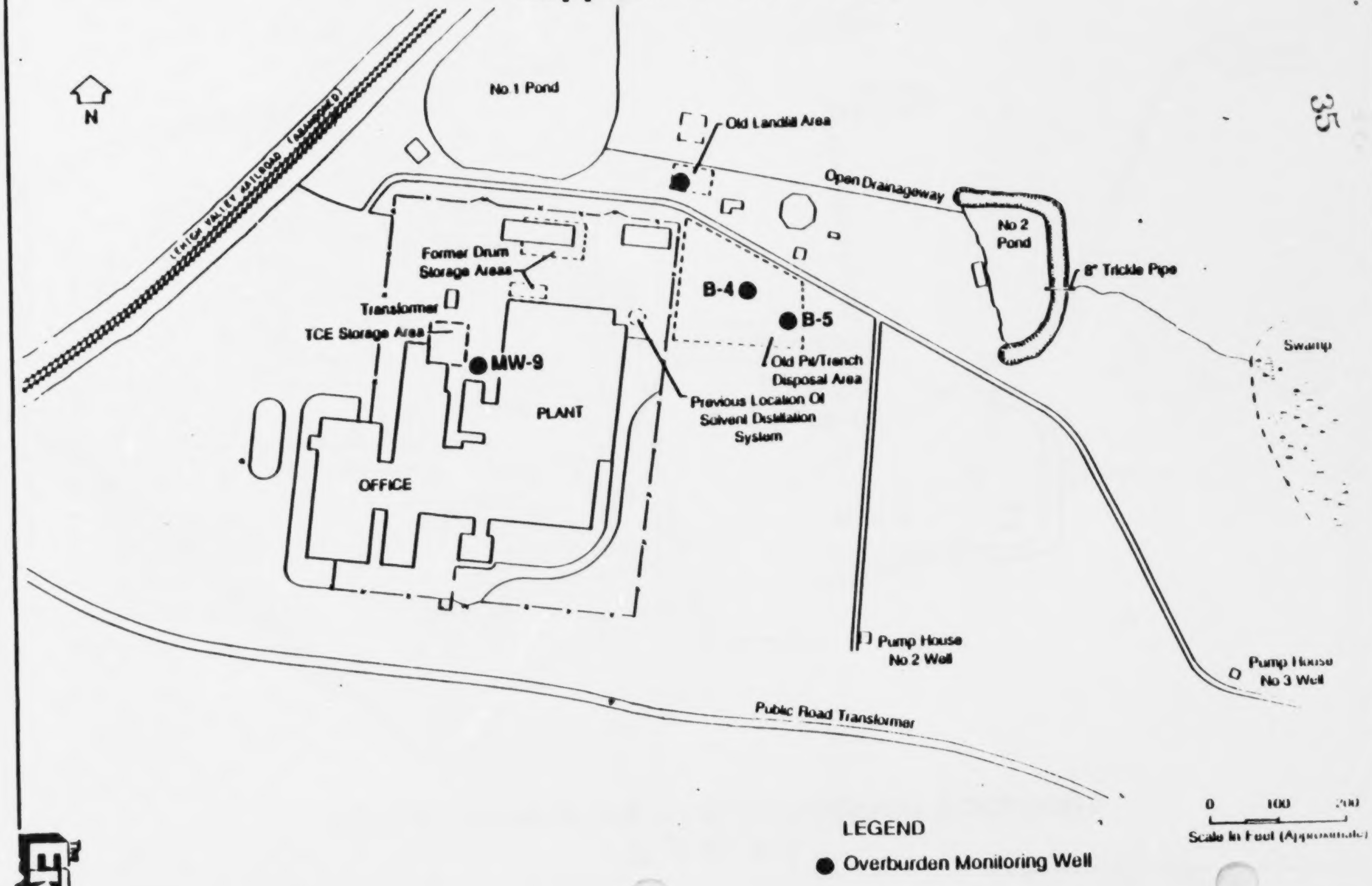
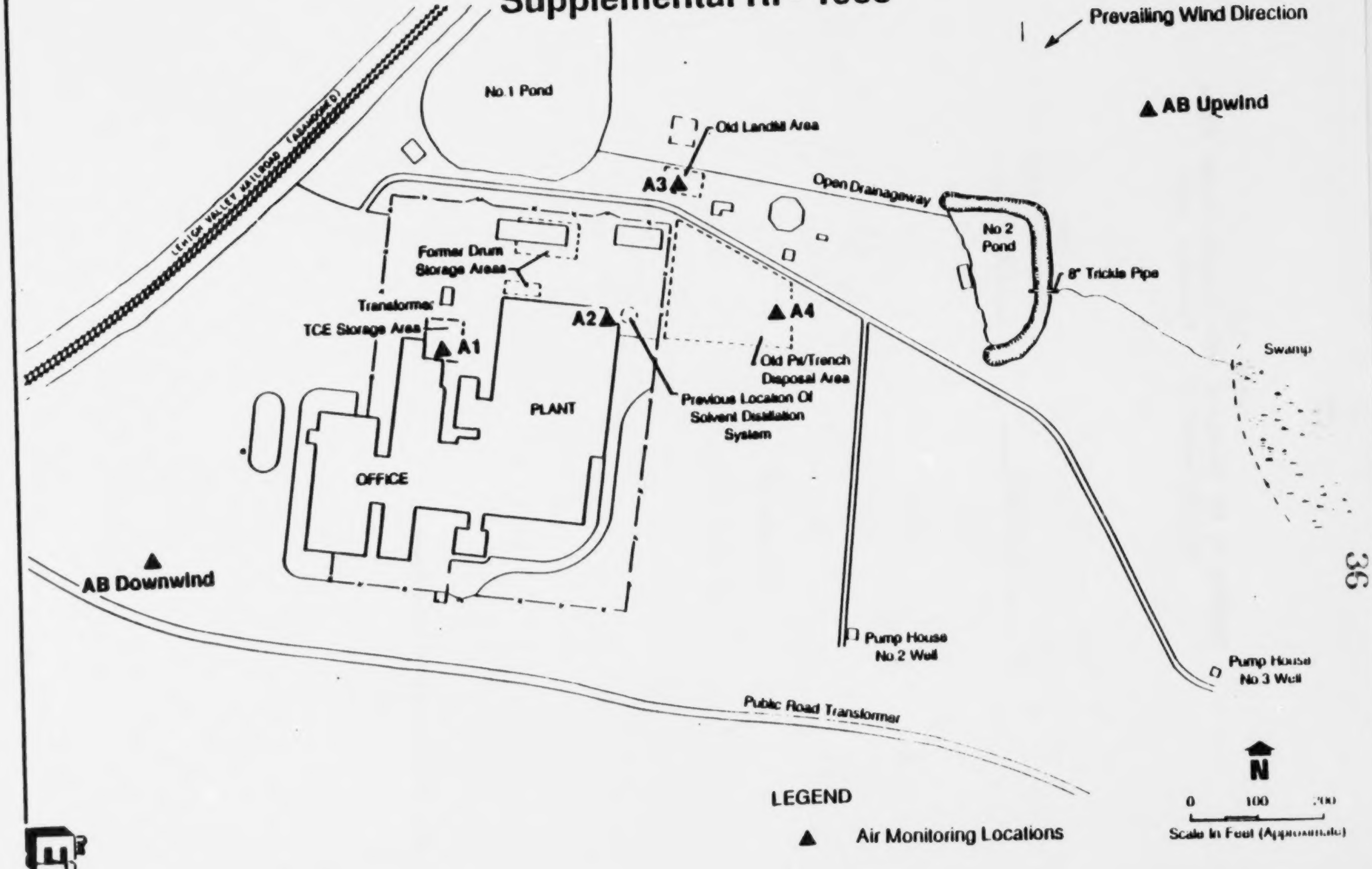

N
LEHIGH VALLEY RAILROAD
No 1 Pond
Old Landfill Area
Open Drainageway
No 2 Pond
8" Trickle Pipe
Swamp
Former Drum Storage Areas
Transformer
TCE Storage Area
MW-9
PLANT
OFFICE
B-4
B-5
Old Pit/Trench Disposal Area
Previous Location Of Solvent Distillation System
Pump House No 2 Well
Pump House No 3 Well
Public Road Transformer
LEGEND
● Overburden Monitoring Well
0
100
200
Scale In Feet (Approximate)

Figure 2-3
Air Monitoring Locations
Supplemental RI - 1988


Prevailing Wind Direction
AB Upwind
No.1 Pond
Old Landfill Area
A3
Open Drainageway
No 2 Pond
8" Trickle Pipe
Swamp
LEHIGH VALLEY RAILROAD (ABANDONED)
Former Drum Storage Areas
Transformer
TCE Storage Area
A1
A2
A4
Old Pit/Trench Disposal Area
Previous Location Of Solvent Distillation System
PLANT
OFFICE
AB Downwind
Pump House No 2 Well
Pump House No 3 Well
Public Road Transformer
LEGEND
Air Monitoring Locations
N
0
100
200
Scale In Feet (Approximate)

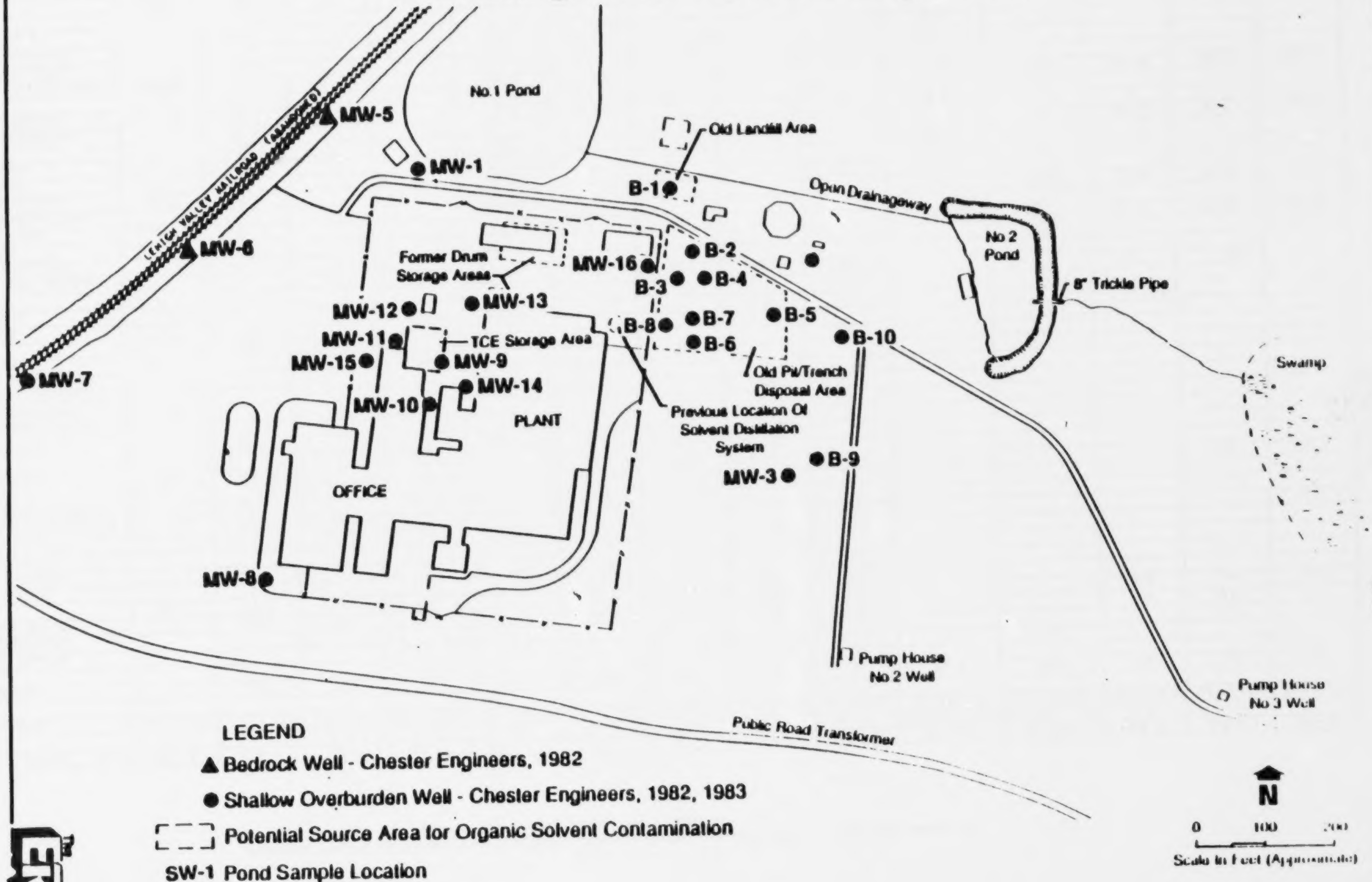
ERM

Table 3-7
Results of Air Sampling with Organic Vapor Meter
Supplemental RI - February 1988

Location	VOC Concentration (ppm)*
A1	0.1
A2	0.0
A3	0.0
A4	0.1
AB (upwind)	0.1
AB (downwind)	0.0

* ppm above calibrated background

Figure 1-3
Location of Soil Borings and Monitoring Wells - Chester Engineers


No.1 Pond
MW-5
MW-1
Old Landfill Area
B-1
Open Drainageway
No 2 Pond
8" Trickle Pipe
Swamp
Lehigh Valley Railroad
MW-6
MW-7
Former Drum Storage Areas
MW-16
B-2
B-3
B-4
MW-12
MW-13
MW-11
TCE Storage Area
MW-15
MW-9
B-8
B-7
B-5
B-6
B-10
Old Pit/Trench Disposal Area
MW-14
MW-10
PLANT
Previous Location Of Solvent Distillation System
OFFICE
B-9
MW-3
MW-8
Pump House No 2 Well
Pump House No 3 Well
Public Road Transformer
N
0
100
200
Scale in Feet (Approximate)

LEGEND

▲ Bedrock Well - Chester Engineers, 1982

● Shallow Overburden Well - Chester Engineers, 1982, 1983

[ ] Potential Source Area for Organic Solvent Contamination

SW-1 Pond Sample Location

PS-1 Pond Sediment Sample Location

39

Table 3-1
Analytical Results for Volatile and Semi-Volatile Organic Compounds and PCBs in Soils and Sediments
Supplemental RI - 1988*

Sample Location	ST-1	SE-1	SL-1	SL-2	SL- 1+2	SP-1	SP-2	SP-3	SP-4	SP-1+2	SP 3+4	SB-1	SB-2	SS-1
Depth	4-8'	1-4'	0-1'	3-4'	4-8'	0-2'	7-8'	0-2'	4-6'	(comp) 4-8'	(comp) 4-8'	4-8'	4-8'	
Date Sampled	2/16/88	2/16/88	2/15/88	2/15/88	2/15/88	2/16/88	2/16/88	2/16/88	2/16/88	2/16/88	2/16/88	2/15/88	2/15/88	2/17/88
% Moisture	11	18	22.0	12	18 6	19	17	17	21	12 5	9 8	12	12	87
Volatile Organic					NA					NA	NA			
Compounds:														
methylene chloride	5 B	23 B	2 B	11 B		10 B	7 B	8 B	7 B			7 B	3 B~	
acetone	50 B	14 B	10 B	4 B		14 B	7 B	53 B	45 B			4 B	5 B	5 B
carbon disulfide		30		13		8	2 J	2 J	2 J					
1,1-dichloroethene		9		4 J		3 J								
1,1-dichloroethane														
1,2-dichloroethane				2 J		2 J		2 J						
1,2-dichloroethene (total)		290 J	14	4 J		270 J	2 J	2 J	6 J					2 J
trans-1,2-dichloroethene		280				270								
chloroform		27		13		15		9						
trichloroethene	84	400 J		1 B		99	17	1 B	13				2 B	46 J
benzene				2 J		2 J		1 B						
tetrachloroethene		180 J				29								
1,1,1-trichloroethane						5 J								
carbon tetrachloride														
4-methyl-2-pentanone						1 B		3 B						
1,1,1-tetrachloroethane														
ethylbenzene				1 B										
toluene		6 B		2 B					2 B					
2-butanone	2 J													
total xylenes	1 B			9				3 B	3 B					
Semivolatile Organic			NA	NA		NA	NA	NA	NA					
Compounds:														
benzoic acid														206 J
diethylphthalate	51 B	100 B			87 B					60 B	88 B	98 B	71 B	104 B
n-nitrosodiphenylamine					45 J									
di-n-butylphthalate	65 B	52 B			79 B					53 B	45 B	74 B	81 B	125 J
phenanthrene		69 J			120 J					69 J				
fluoranthene		130 J			190 J					130 J				
pyrene		120 J			180 J					150 J				
butylbenzylphthalate		43 B										39 B	39 B	40 B
benzo(a)anthracene		58 J			78 J					63 J				
chrysene		78 J			92 J					74 J				
bis(2-ethylhexyl)phthalate	170 B	590 B			180 B					140 B	150 B	250 B	290 B	300 B
benzo(b)fluoranthene		61 J			79 J					70 J				
bnezo(k)fluoranthene		47 J			81 J					58 J				
benzo(a)pyrene		49 J			100 J					57 J				
PCBs:	ND	ND	NA	NA	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND

Qualifier Codes:

B: This result is of questionable qualitative significance since this compound was also detected in a blank at a similar concentration.

J: This result should be considered a quantitative estimate.

NA: This sample was not analyzed for this parameter.

ND: none detected

All results in ug/kg ; Dry weight corrected

*: These sample results are reported on as received basis

The ERM Group

Table 3-3
Analytical Results for Metals in Soils and Sediment Samples
Supplemental RI - 1988

Sample Location	ST-1	SE-1	SL- 1+2	SP-1+2 (comp)	SP 3+4 (comp)	SB-1#	SB-2#	SS-1*
depth	4-8'	1-4'	4-8'	4-8'	4-8'	4-8'	4-8'	
Date Sampled	2/16/88	2/16/88	2/15/88	2/16/88	2/16/88	2/15/88	2/15/88	2/17/88
Moisture %	10.5	17.9	18.6	12.5	9.8	11.6	11.8	87
Inorganic								
Constituents:								
antimony								
beryllium						0.6	0.6	
cadmium								0.8
chromium	17.9	12.2	28.3 J	17.1	17.7	19.2	18.1	12
copper	22.3	13.4	20.9	22.9	18.8	21.5	19.3	90
mercury								0.3
nickel	22.3	12.2	23.3	22.9	23.3	22.6	20.4	8
silver								3
arsenic	12.3	8.5	11.1 J	12.6	11.1	10.2	11.3	1
zinc	62.6	40.2	65.1	80	65.4	67.9	57.8	77 J
lead	13.4 B	12.1 B	17 B	17	12.3 B	14 B	20.4	6
selenium								
thallium								

Qualifier Codes:
B: This result is of questionable qualitative significance since this compound was aslo detected in a blank at a similar concentration.
J: This result should be considered a quanitiatve estimate.
All results in mg/kg : Dry weight corrected
* These sample results are reported as received
# Background Samples

The ERM Group

Table 3-2
Comparison of 1984 and 1988 Volatile Organic Data for Soil Samples
Bendix-South Montrose

Boring Location	Range of Total VOCs* 1984 (ppb)	Total VOCs 1988 (ppb)
Former TCE Storage Area:		
ST-1, 4'-8'	ND to 10,560	139
Former Solvent Evaporation Area:		
SE-1, 1'-4'	40 to 184,700	968
Pit/Trench Area:		
SP-1, 0'-2'	ND to 3,000	444.4
SP-2, 7'-8'	60 to 260	24.2
SP-3, 0'-2'	ND to 3,000	71.1
SP-4, 4'-6'	ND to 40	64.3
Old Landfill Area:		
SL-1, 0'-1'	4,700	14
SL-2, 3'-4'	4,700	40

---

* Range given for samples taken from approximately the same depth.

Table 3-4
Analytical Results for Volatile and Semi-Volatile Organic Compounds and PCBs
Ground Water and Surface Water Samples
Supplemental RI - 1988

Sample Location	B-1	B-4	B-5	MW-9	S-1(parking lot)	S-2 (Pond1)	S-3 (Pond 2)
Date Sampled	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88
Volatile Organic							
Compounds:							
toluene	290 B		1,200 B				
ethylbenzene	780						
vinyl chloride	1,200						
methylene chloride			700 B	30,000 B			
1,1-dichloroethane			500				
trans-1,2-dichloroethene	7,300	1,400	20,000			4	7
chloroform		80 B	800				2 B
1,1,1-trichloroethane		50	4,900				
carbon tetrachloride				20000			
trichloroethene		360	39,000	980000	6	5	80
tetrachloroethene			1,000				
Semivolatile Organic							
Compounds:	ND	ND				ND	ND
phenol			26 B				
dimethyl phthalate				63			
bis (2-ethylhexyl) phthalate			22 B				
fluoranthene					10		
PCBs:	ND	ND		ND	ND	ND	ND
archlor 1242			13				

Qualifier Codes:

B: This result is of questionable qualitative significance since this compound was also detected in a blank at a similar concentration.

J: This result should be considered a quantitative estimate.

NA: This sample was not analyzed for this parameter.

ND: none detected

All results in ug/l

Table 3-6
Analytical Results for Metals in Ground Water and Surface Water
Supplemental RI - 1988

Sample Location	B-1	B-4	B-5	MW-9	S-1 (Parking Lot)	S-2 (Pond1)	S-3 (Pond 2)	Bendix Production Well	Drinking Water Standard*
Date Sampled	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88	2/17/88		
Inorganic Constituents:									
Antimony								NA	-
Beryllium								NA	-
Cadmium								<5	5
Chromium								<50	120
Copper			50		40	40	30	40-70	1300
Mercury			0.8					NA	3
Nickel			90					<40	-
Silver								<10	50
Arsenic	10		10		10			NA	50
Zinc		20 B	250	40 B	220	30 B	80	30-40	5000
Lead			10 B		115			<50	20
Selenium								NA	45
Thallium								NA	-

Qualifier Codes:

B: This result is of questionable qualitative significance since this compound was also detected in a blank at a similar concentration.

J: This result should be considered a quantitative estimate.

ND: none detected

NA: Not analyzed for

- : none available

* : Recommended Maximum Contaminant Level

Table 3-5
Comparison of 1984 and 1988 Volatile Organic Data for Ground Water Samples
Bendix - South Montrose Supplemental RI

Monitoring Well	Range of Total VOCs 1982-1984 (ppb)	Total VOCs 1988 (ppb)
MW-9	1,338,100 - 380,472	1,030,000
B-1	8,075 - 3,360	9,570
B-4	not sampled	1,890
B-5	329,400 - 19,927	67,300

Bendix Aerospace
301 06
Page 1 of 18

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro ethylvinyl-ether
1	A	08/13/84	0	0											
1	A	04/22/85	0	0											
1	A	08/12/85	0	0											
1	A	11/04/85	0	0											
1	A	01/06/86	0	0											
1	A	05/06/86	0	0											
1	A	08/05/86	0	0											
1	A	11/05/86	0	0											
1	A	01/28/87	0	0											
1	A	11/05/87	0	0											
1	A	02/03/88	BMDL	0									BMDL B	BMDL B	
1	A	04/20/88	0	0											
2	C	10/02/84	4	0		1	3								
2	C	11/14/84	0	0											
2	C	12/04/84	0	0											
2	C	03/13/85	0	0											
2	C	06/24/85	0	0											
2	C	08/12/85	0	0											
2	C	11/04/85	0	0							FILTERS RECHARGED ·····		01/86	0	
2	C	01/06/86	0	0											
2	C	03/10/86	0	0											
2	C	05/06/86	0	0							FILTERS RECHARGED ·····		11/86		
2	C	01/28/87	0	0											
2	C	04/27/87	41	0								4 B		37 S	
2	C	07/22/87	0	0											
2	C	11/05/87	0	0							FILTERS RECHARGED ·····		11/87		
2	C	02/03/88	BMDL	0										BMDL B	
2	C	04/20/88	0	0											
2	B	10/02/84	0	0											
2	B	11/14/84	0	0											
2	B	03/13/85	0	0											
2	B	06/24/85	1	0										1	
2	B	08/12/85	0	0											
2	B	11/04/85	4	0										4	
2	B	01/06/86	0	0											
2	B	03/10/86	0	0											
2	B	05/06/86	0	0											
2	B	01/28/87	0	0											
2	B	04/27/87	0	0											
2	B	07/22/87	0	0											
2	B	11/05/87	0	0											
2	B	02/03/88	BMDL	0										BMDL B	
2	B	04/20/88	BMDL	0										BMDL B	

PRELIMINARY
DATA

DATA ENTERED DATE

D[illegible] REVIEWED DATE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
2	A	08/13/84	13	13											
2	A	10/02/84	9	9											
2	A	11/14/84	5	5	1										
2	A	12/04/84	4	4											
2	A	03/13/85	0	0											
2	A	04/22/85	0	0											
2	A	06/24/85	7	7					2					0	
2	A	08/12/85	28	28											
2	A	11/04/85	13	13											
2	A	01/06/86	0	0											
2	A	03/10/86	0	0	POTENTIAL LAB ERROR-RESULTS TO BE VERIFIED										
2	A	05/06/86	360	360											
2	A	08/05/86	0	0											
2	A	11/05/86	0	0											
2	A	01/28/87	0	0											
2	A	04/27/87	0	0										BMDL B	
2	A	07/22/87	0	0											
2	A	11/05/87	0	0											
2	A	02/03/88	BMDL	0											
2	A	4/20/88	0	0											
3	C	02/22/85	0	0											
3	C	06/24/85	0	0							FILTER RECHARGED ·····		01/86		
3	C	08/12/85	0	0							FILTER RECHARGED ·····		12/86		
3	C	11/04/85	0	0											
3	C	01/06/86	0	0											
3	C	03/10/86	0	0							FILTER RECHARGED ·····		11/87		
3	C	05/06/86	0	0											
3	C	01/28/87	0	0											
3	C	04/27/87	0	0										3 B	
3	C	11/05/87	0	0											
3	C	02/03/88	0	0											
3	C	04/20/88	3	0											
3	B	02/22/86	0	0											
3	B	06/24/85	0	0											
3	B	08/12/85	0	0										1	
3	B	11/04/85	0	0											
3	B	01/06/86	0	0											
3	B	03/10/86	1	0											
3	B	05/06/86	0	0											
3	B	01/28/87	0	0											
3	B	04/27/87	0	0										BMDL B	
3	B	11/05/87	0	0											
3	B	02/03/88	0	0											
3	B	04/20/88	BMDL	0											

PRELIMINARY DATA
DATA LOGGED DATE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

Bendix Aerospace
301 06
Page 3 of 18

LOC #	TAP #	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
3	A	08/13/84	3	3											
3	A	02/22/85	7	7											
3	A	04/22/85	11	11											
3	A	06/24/85	0	0											
3	A	08/12/85	7	7											
3	A	11/04/85	7	7											
3	A	01/06/86	4	4											
3	A	03/10/86	4	4											
3	A	05/06/86	11	11											
3	A	08/05/86	8	8											
3	A	11/05/86	12	12											
3	A	01/28/87	11	11											
3	A	04/27/87	6	6											
3	A	11/05/87	20	20											
3	A	02/03/88	8	8										BMDL B	
3	A	04/20/88	10	10										BMDL B	
4	C	08/12/84	8	2	0		2	2	0	2					
4	C	10/02/84	6	0	2	1	2				1				
4	C	12/04/84	0	0											
4	C	02/22/85	0	0											
4	C	11/04/85	0	0					0						
4	C	05/06/86	0	0						FILTERS RECHARGED - - - - -			11/86		
4	C	01/28/87	0	0						FILTERS RECHARGED - - - - -			11/87		
4	C	11/05/87	12	12											
4	C	02/04/88	0	0											
4	C	4/20/88	2	0										2 B	
4	B	10/02/84	2	2	0				0						
4	B	02/22/85	0	0											
4	B	11/04/85	1	1					0						
4	B	05/06/86	0	0											
4	B	01/28/87	0	0											
4	B	11/05/87	0	0											
4	B	02/04/88	BMDL	0									BMDL B	BMDL B	
4	B	04/20/88	2	0										2 B	
4	A	08/13/84	66	60	2				4						
4	A	08/12/84	46	35	2		3		6						
4	A	10/02/84	84	73	3				8						
4	A	12/04/84	16	16											
4	A	02/22/85	56	53					3						
4	A	11/04/85	69	66					3						
4	A	05/06/86	9	9											
4	A	08/05/86	9	8											
4	A	11/05/86	70	67					3						
4	A	01/28/87	14	14											
4	A	11/05/87	14	14											
4	A	02/04/88	10	10											
4	A	04/20/88	15	13					BMDL B					2 B	BMDL S

PRELIMINARY
DATA

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PRE

ISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

Bendix Aero.
301 06
Page 4 of 18

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl ether
5	C	09/12/84	3	3					0			0			
5	C	09/26/84	0	0											
5	C	12/04/84	0	0											
5	C	02/22/85	0	0											
5	C	04/25/85	0	0											
5	C	06/24/85	0	0											
5	C	08/12/85	0	0	1										
5	C	11/04/85	0	0					0						
5	C	01/06/86	0	0						BOTH FILTERS RECHARGED	-----		01/86		
5	C	03/10/86	0	0											
5	C	05/06/86	0	0						BOTH FILTERS RECHARGED	-----		11/86		
5	C	01/28/87	0	0											
5	C	04/27/87	0	0											
5	C	07/22/87	0	0											
5	C	11/05/87	0	0						BOTH FILTERS RECHARGED	-----		11/87		
5	C	02/04/88	BMDL	0									BMDL B	BMDL B	
5	C	04/20/88	0	0											
5	B	08/26/84	0	0											
5	B	02/22/85	0	0											
5	B	04/25/85	0	0											
5	B	06/24/85	0	0											
5	B	08/12/85	1	1											
5	B	11/04/85	1	1					0						
5	B	01/06/86	0	0											
5	B	03/10/86	0	0											
5	B	05/06/86	0	0											
5	B	01/28/87	0	0											
5	B	04/27/87	0	0											
5	B	07/22/87	0	0											
5	B	11/03/87	0	0											
5	B	02/04/88	BMDL	0									BMDL B	BMDL B	
5	B	04/20/88	0	0											
5	A	08/13/84	42	20	12				2			8			
5	A	08/12/84	41	29	5				3			4			
5	A	08/28/84	22	22											
5	A	12/04/84	18	16	4										
5	A	02/22/85	22	22											
5	A	04/25/85	6	6											
5	A	06/24/85	13	13											
5	A	08/12/85	32	30					2						
5	A	11/04/85	28	27					1						
5	A	01/06/86	10	10											
5	A	03/10/86	5	5											
5	A	05/06/86	6	6											
5	A	08/05/86	9	9											
5	A	11/05/86	29	28					1						
5	A	01/28/87	8	8											
5	A	04/27/87	35	0								5 B		30 S	
5	A	07/22/87	9/13	8/13							1/0				
5	A	11/03/87	15	15											
5	A	02/04/88	10	10					BMDL						
5	A	04/20/88	5	5					BMDL B						

* 9/13 = result from Lancaster Laboratories/result from Cambridge analytical

PRELIMINARY DATA

DATA ENTERED DATE

DATA REVIEWED DATE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
6	A	08/13/84	0	0											
6	A	11/04/85	0	0											
6	A	01/06/86	0	0											
6	A	05/07/86	0	0											
6	A	08/05/86	0	0											
6	A	11/05/86	0	0											
6	A	01/28/87	0	0											
6	A	04/27/87	84	0								4 B		80 S	
6	A	07/22/87	0	0											
6	A	11/05/87	0	0											
6	A	02/04/88	BMDL	BMDL										BMDL B	
6	A	04/20/88	0	0											
7	A	08/13/84	0	0											
8	C	09/26/84	0	0											
8	C	11/14/84	0	0											
8	C	12/04/84	0	0											
8	C	02/22/85	0	0											
8	C	06/24/85	0	0											
8	C	08/12/85	0	0											
8	C	11/04/85	0	0							FILTERS RECHARGED - - - - -		01/86		
8	C	01/06/86	0	0											
8	C	03/10/86	0	0							FILTERS RECHARGED - - - - -		12/86		
8	C	05/07/86	0	0											
8	C	01/28/87	0	0							FILTERS RECHARGED - - - - -		11/87		
8	C	11/05/87	0	0											
8	C	02/03/88	0	0											
8	C	04/22/88	2	0										2 B	
8	B	09/26/84	0	0											
8	B	11/14/84	0	0											
8	B	02/22/85	0	0											
8	B	06/24/85	0	0											
8	B	08/12/85	0	0											
8	B	11/04/85	0	0											
8	B	01/06/86	0	0											
8	B	03/10/86	0	0											
8	B	05/07/86	0	0											
8	B	01/28/87	1	0										1	
8	B	11/05/87	0	0											
8	B	02/03/88	0	0											
8	B	04/22/88	BMDL	0										BMDL B	

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEWED DATE

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ISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl ether
8	A	08/13/84	9	9											
8	A	09/26/84	18	18											
8	A	11/14/84	4	4											
8	A	12/04/84	5	5											
8	A	02/22/85	13	13											
8	A	04/22/85	2	2											
8	A	06/24/85	8	8											
8	A	08/12/85	0	6											
8	A	11/04/85	13	13											
8	A	01/06/86	6	6											
8	A	03/10/86	2	2											
8	A	05/07/86	7	7											
8	A	08/05/86	3	3											
8	A	11/05/86	15	15											
8	A	01/28/87	3	3											
8	A	11/05/87	6	6											
8	A	02/03/88	3	3											
8	A	04/22/88	4	3										1 B	
10	A	08/13/84	0	0											
10	A	01/28/87	0	0											
10	A	04/18/88	0	0											
11	C	08/12/84	0	0					0						
11	C	08/26/84	0	0		0									
11	C	11/14/84	0	0											
11	C	12/04/84	0	0					0						
11	C	02/22/85	0	0											
11	C	06/24/85	0	0											
11	C	08/12/85	0	0											
11	C	11/04/85	0	0					0						
11	C	01/06/86	0	0					0						
11	C	03/10/86	0	0											
11	C	05/07/86	0	0											
11	C	01/28/87	0	0											
11	C	04/27/87	0	0											
11	C	02/03/88	0	0											
11	C	04/21/88	BMDL	0										BMDL B	
11	B	08/26/84	1	0		1									
11	B	11/14/84	0	0											
11	B	02/22/85	0	0											
11	B	06/24/85	0	0											
11	B	08/12/85	0	0											
11	B	11/04/85	0	0					0						
11	B	01/06/86	0	0					0						
11	B	03/10/86	0	0											
11	B	05/07/86	0	0											
11	B	01/28/87	0	0											
11	B	04/27/87	0	0											
11	B	02/03/88	0	0											
11	B	04/21/88	BMDL	0										BMDL B	

FILTERS RECHARGED ----- 01/86
FILTERS RECHARGED ----- 11/86
FILTERS RECHARGED ----- 12/87

PRELIMINARY DATA

DATA ENTERED
DATE

TABLE 2

EAST SIDE
Remediation Alternatives Summary

Assessment Factors	Alternate 1 -- No Action	Alternative 2 -- Soil Aeration; Ground Water Recovery/Treatment	Alternative 3 -- Off site Disposal, Vacuum Extraction, Ground Water Recovery/Treatment	Alternative 4 -- Vacuum Extraction Ground Water Recovery/Treatment	Alternative 5 -- Soil Aeration, Vacuum Extraction, Ground Water Recovery/Treatment
Compliance with ARARs					
- Compliance with ARARs	MCLs in ground water would not be attained.	All ARARs will be met.	All ARARs will be met.	All ARARs will be met.	All ARARs will be met.
- Appropriateness of waivers	Not justifiable.	Not applicable	Required due to Land Ban restrictions	Not applicable	Not applicable
- Compliance with criteria, advisors, and guidance	Does not meet requirements of administrative consent order.	Complies with state and local criteria and federal advisories.	Complies with state and local criteria and federal advisories.	Complies with state and local criteria and federal advisories.	Complies with state and local criteria and federal advisories.
Overall Protection of Human Health and the Environment					
- How risks are eliminated, reduced, or controlled	Risk to human health from ingestion of contaminated ground water is not controlled. Environmental degradation will continue as leaching from on site soils continues.	Risk of direct contact with contaminated soils and dust significantly reduced by treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment; risk to human health and the environment significantly reduced by ground water recovery and treatment.	Risk of direct contact with contaminated soils and dust significantly reduced by removal of soils from landfill and pit areas; similar reduction of risk by treatment of soils; contaminant migration from on site soils to ground significantly reduced by soil treatment; risk to human health and the environment significantly reduced by ground water extraction and treatment.	Risk of direct contact with contaminated soils and dust significantly reduced by treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment, risk to human health and the environment significantly reduced by ground water recovery and treatment.	Risk of direct contact with contaminated soils and dust significantly reduced by treatment of soils. Contaminant migration from on site soils to ground water significantly reduced by soil treatment, risk to human health and the environment significantly reduced by ground water recovery and treatment.

* Calculated according to method outlined in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA", Draft, March 1988

(a) n = 30 yrs for pumping
(b) n = 5 yrs for vapor extraction and dewatering, n = 30 yrs for pumping

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ISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
11	A	08/27/84	39	33	3				3						
11	A	09/12/84	20	18					2						
11	A	09/26/84	5	3							2				
11	A	11/14/84	12	12											
11	A	12/04/84	18	17					1						
11	A	02/22/85	25	24					1						
11	A	04/22/85	10	8										1	
11	A	06/24/85	32	30					2						
11	A	08/12/85	41	38	1				2						
11	A	11/04/85	36	34					2						
11	A	01/06/86	32	30					2						
11	A	03/10/86	20	20											
11	A	05/07/86	13	13											
11	A	08/05/86	13	13											
11	A	11/05/86	34	33					1						
11	A	01/28/87	17	17											
11	A	04/27/87	13	13											
11	A	02/03/88	20	20					BMDL					BMDL B	
11	A	04/21/88	14	14					BMDL B				BMDL	BMDL B	
12	C	01/07/85	0	0											
12	C	02/22/85	0	0											
12	C	06/24/85	0	0											
12	C	08/12/85	0	0											
12	C	11/04/85	0	0											
12	C	01/06/86	0	0											
12	C	03/10/86	0	0											
12	C	05/07/86	0	0											
12	C	01/28/87	0	0											
12	C	04/27/87	0	0											
12	C	11/02/87	0	0											
12	C	02/03/88	0	0											
12	C	04/21/88	BMDL	0										BMDX B	
12	B	01/07/85	0	0											
12	B	02/22/85	0	0											
12	B	06/24/85	1	0										1	
12	B	08/12/85	0	0											
12	B	11/04/85	0	0											
12	B	01/06/86	0	0											
12	B	03/10/86	0	0											
12	B	05/07/86	0	0											
12	B	01/28/87	0	0											
12	B	04/15/87	0	0											
12	B	11/02/87	0	0											
12	B	02/03/88	0	0											
12	B	04/21/88	0	0											

FILTERS RECHARGED - - - - - 01/86

FILTERS RECHARGED - - - - - 12/86

FILTERS RECHARGED - - - - - 11/87

PRELIMINARY DATA

DATA ENTERED ______ DATE ______

DATA REVIEWED ______ DATE ______

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
12	A	08/27/84	9	8							1				
12	A	01/07/85	1	1											
12	A	02/22/85	8	8											
12	A	04/22/85	0	0											
12	A	06/24/85	6	6											
12	A	08/12/85	7	7											
12	A	11/04/85	6	6											
12	A	01/06/86	4	4											
12	A	03/10/86	0	0											
12	A	05/07/86	2	2											
12	A	08/05/86	3	3											
12	A	11/05/86	0	0											
12	A	01/28/87	3	3											
12	A	06/15/87	5	3										2	
12	A	11/02/87	4	4											
12	A	02/03/88	2	2											
12	A	04/21/88	3	3										BMDL B	
13	C	02/22/85	0	0											
13	C	06/24/85	0	0											
13	C	08/12/85	0	0											
13	C	11/04/85	0	0											
13	C	01/06/86	0	0											
13	C	03/10/86	0	0											
13	C	05/07/86	0	0											
13	C	01/28/87	0	0											
13	C	04/27/87	0	0											
13	C	11/02/87	0	0											
13	C	02/04/88	0	0											
13	C	04/21/88	0	0											
13	B	02/22/85	0	0											
13	B	06/24/85	0	0											
13	B	08/12/85	0	0											
13	B	11/04/85	0	0											
13	B	01/06/86	0	0											
13	B	03/10/86	0	0											
13	B	05/07/86	0	0											
13	B	01/28/87	0	0											
13	B	04/27/87	0	0											
13	B	11/02/87	0	0											
13	B	02/04/88	0	0											
13	B	04/21/88	1	0										1 B	BMDL S
13	A	08/27/84	0	0											
13	A	09/12/84	1	1											
13	A	02/22/85	2	2											
13	A	04/22/85	0	0											
13	A	06/24/85	0	0											
13	A	08/12/85	2	2											
13	A	11/04/85	0	0											
13	A	01/06/86	0	0											

FILTERS RECHARGED - - - - - 01/86

FILTERS RECHARGED - - - - - 12/86

FILTERS RECHARGED - - - - - 12/87

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEW DATE

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

Bendix Aerospace
301 06
Page 9 of 18

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATIKES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
13	A	03/10/86	0	0											
13	A	05/07/86	0	0											
13	A	08/05/86	0	0											
13	A	11/05/86	0	0											
13	A	01/28/87	0	0											
13	A	04/27/87	0	0											
13	A	11/02/87	0	0											
13	A	02/04/88	BMDL	BMDL											
13	A	04/21/88	3	BMDL										3 B	BMDL 5
14	A	08/27/84	0	0											
									FILTERS RECHARGED AND REMOVED FOR WINTER -----					01/86	
									FILTERS RECHARGED AND REMOVED FOR WINTER -----					11/86	
									FILTERS RECHARGED AND REMOVED FOR WINTER -----					11/87	
15	C	06/24/85	0	0											
15	C	08/12/85	0	0											
15	C	04/27/87	0	0											
15	C	04/21/88	BMDL	0										BMDL B	
15	B	06/24/85	0	0											
15	B	08/12/85	0	0											
15	B	05/07/86	0	0											
15	B	04/27/87	0	0											
15	B	04/21/88	BMDL	BMDL											
15	A	08/27/84	3	1						2					
15	A	09/12/84	3	1							2				
15	A	04/22/85	0	0											
15	A	06/24/85	0	0											
15	A	08/12/85	0	0											
15	A	05/07/86	0	0											
15	A	08/05/86	0	0											
15	A	04/27/87	0	0											
15	A	04/21/88	BMDL	BMDL											
16	A	08/27/84	0	0											
16	A	04/22/85	0	0											
16	A	08/12/85	0	0											
16	A	11/04/85	0	0											
16	A	01/06/86	0	0											
16	A	05/07/86	0	0											
16	A	11/05/86	0	0											
16	A	01/28/87	0	0											
16	A	04/27/87	0	0											
16	A	11/05/87	0	0											
16	A	02/03/88	BMDL	0									BMDL B	BMDL B	
16	A	04/21/88	0	0											
17	A	08/27/84	0	0											

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEWED DATE

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

Bendix Aerospace
301 06
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LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
18	A	08/27/84	1	0		1									
18	A	04/23/85	0	0											
18	A	08/12/85	0	0											
18	A	11/04/85	0	0											
18	A	01/06/86	0	0											
18	A	05/07/86	0	0											
18	A	08/05/86	0	0											
18	A	11/05/86	0	0											
18	A	01/28/87	0	0											
18	A	04/27/87	0	0											
18	A	11/02/87	0	0											
18	A	02/02/88	0	0											
18	A	04/18/88	0	0											
19	C	06/24/85	0	0											
19	C	08/12/85	0	0											
19	C	11/04/85	0	0											
19	C	01/06/86	0	0											
19	C	03/10/86	0	0											
19	C	05/07/86	0	0							FILTERS RECHARGED - - - - -		12/86		
19	C	01/28/87	0	0											
19	C	04/27/87	0	0											
19	C	11/02/87	0	0							FILTERS RECHARGED - - - - -		11/87		
19	C	02/02/88	0	0											
19	C	04/21/88	0	0											
19	B	06/24/85	1	0										1	
19	B	08/12/85	1	0										1	
19	B	11/04/85	0	0											
19	B	01/06/86	0	0											
19	B	03/10/86	0	0											
19	B	05/07/86	0	0											
19	B	01/28/87	0	0											
19	B	04/27/87	2	0			2								
19	B	11/02/87	0	0											
19	B	02/02/88	0	0											
19	B	04/21/88	0	0											
19	A	08/27/84	2	0		2									
19	A	04/22/85	1	1											
19	A	06/24/85	0	0											
19	A	08/12/85	0	0											
19	A	11/04/85	0	0											
19	A	01/06/86	0	0											
19	A	03/10/86	0	0											
19	A	05/07/86	0	0											
19	A	08/05/86	1	1											
19	A	11/05/86	0	0											
19	A	01/28/87	0	0											
19	A	04/27/87	0	0											
19	A	11/02/87	0	0											
19	A	02/02/88	BMDL	BMDL											
19	A	04/21/88	BMDL	BMDL											

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEWED DATE

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ISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
20	C	11/04/85	0	0											
20	C	01/06/86	0	0											
20	C	03/10/86	1	0										1	
20	C	05/07/86	0	0											
										FILTERS RECHARGED -----			12/86		
20	C	01/29/87	0	0											
20	C	04/27/87	0	0											
										FILTERS RECHARGED -----			11/87		
20	C	02/04/88	BMDL	0										BMDL B	
20	C	04/22/88	BMDL	0										BMDL B	
20	B	11/04/85	0	0											
20	B	01/06/86	0	0											
20	B	03/10/86	0	0											
20	B	05/07/86	0	0											
20	B	01/29/87	0	0											
20	B	04/27/87	0	0											
20	B	02/04/88	BMDL	0									BMDL B		
20	B	04/22/88	BMDL	0										BMDL B	
20	A	08/27/84	1	0		1									
20	A	04/22/85	0	0											
20	A	08/12/85	1	1											
20	A	11/04/85	1	1											
20	A	01/06/86	0	0											
20	A	03/10/86	0	0											
20	A	05/07/86	0	0											
20	A	08/05/86	0	0											
20	A	11/05/86	0	0											
20	A	01/28/87	0	0											
20	A	04/27/87	0	0											
20	A	02/04/88	BMDL	BMDL									BMDL B		
20	A	04/22/88	BMDL	BMDL										BMDL B	
21	C	10/02/84	14	0	8	2	1						2		
21	C	11/14/84	0	0											
21	C	12/04/84	0	0											
21	C	02/22/85	0	0											
21	C	06/24/85	0	0											
21	C	08/12/85	5	5											
21	C	10/13/85	0	0											
21	C	11/04/85	0	0											
										FILTERS RECHARGED -----			01/86		
21	C	01/06/86	0	0											
21	C	03/10/86	0	0											
21	C	05/07/86	0	0											
										FILTERS RECHARGED -----			12/86		
21	C	01/28/87	0	0											
21	C	11/05/87	0	0											
										FILTERS RECHARGED -----			11/87		
21	C	02/03/88	0	0											
21	C	04/21/88	0	0											

PRELIMINARY
DATA

DATA ENTERED ________ DATE ________

DATA REVIEWED ________ DATE ________

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
21	B	10/02/84	0	0											
21	B	11/14/84	0	0											
21	B	02/22/85	0	0											
21	B	06/24/85	0	0											
21	B	08/12/85	0	0											
21	B	10/13/85	0	0											
21	B	11/04/85	0	0	1										
21	B	01/06/86	0	0											
21	B	03/10/86	0	0											
21	B	05/07/86	0	0											
21	B	01/28/87	0	0											
21	B	02/03/88	0	0											
21	B	11/05/87	0	0											
21	B	04/21/88	0	0											
21	A	08/27/84	36	16	18							2			
21	A	10/02/84	16	16											
21	A	11/14/84	0	0											
21	A	12/04/84	0	0											
21	A	02/22/85	11	11											
21	A	04/22/85	0	0											
21	A	06/24/85	8	8											
21	A	08/12/85	6	6											
21	A	10/13/85	3	2	1										
21	A	11/04/85	8	6											
21	A	01/06/86	2	2											
21	A	03/10/86	0	0											
21	A	05/07/86	0	0											
21	A	08/05/86	0	0											
21	A	11/05/86	8	8											
21	A	01/28/87	0	0											
21	A	04/27/87	2	0	2 J										
21	A	11/05/87	0	0								1			
21	A	02/03/88	5	BMDL	4									BMDL B	
21	A	04/21/88	1	0	1 B										
22	A	08/27/84	0	0											
22	A	04/22/87	0	0											
22	A	08/12/85	0	0											
22	A	11/04/85	0	0											
22	A	01/06/86	0	0											
22	A	05/07/86	0	0											
22	A	08/05/86	0	0											
22	A	11/05/86	0	0											
22	A	01/28/87	0	0											
22	A	04/27/87	0	0											
22	A	11/02/87	0	0										2 B	
22	A	02/03/88	2	0											
22	A	04/20/88	0	0											

PRELIMINARY
DATA

DATA ENTERED ____ DATE ____

DATA REVIEWED ____ DATE ____

C - POST
B - MID
A - PRE

STORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

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LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
23	C	12/10/85	0	0											
23	C	01/06/86	0	0											
23	C	03/10/86	0	0						FILTERS RECHANGED -----			12/86		
23	C	01/28/87	0	0											
23	C	04/27/87	0	0											
23	C	11/05/87	0	0						FILTERS RECHANGED -----			12/87		
23	C	02/03/88	0	0										BMDL B	
23	C	04/20/88	BMDL	0											
23	B	12/10/85	0	0											
23	B	01/06/86	0	0											
23	B	03/10/86	0	0											
23	B	01/28/87	0	0											
23	B	04/27/87	0	0											
23	B	11/05/87	0	0											
23	B	02/03/88	0	0											
23	B	04/20/88	0	0											
23	A	08/27/84	0	0											
23	A	04/22/85	0	0											
23	A	08/12/85	0	0											
23	A	11/04/85	1	1											
23	A	12/10/85	0	0										2	
23	A	01/06/86	3	1											
23	A	03/10/86	0	0											
23	A	05/07/86	0	0											
23	A	08/05/86	0	0											
23	A	11/05/86	0	0											
23	A	01/28/87	0	0											
23	A	04/27/87	0	0											
23	A	11/05/87	0	0											
23	A	02/03/88	BMDL	BMDL											
23	A	04/20/88	BMDL	BMDL											
24	A	08/27/84	0	0											
25	A	08/27/84	0	0											
26	A	08/27/84	0	0											
27	A	08/27/84	0	0											
27	A	08/05/88	0	0											
28	A	08/27/84	1	0								1			
28	A	04/22/87	0	0											
28	A	08/12/85	0	0											
28	A	11/04/85	0	0											
28	A	01/06/86	0	0											
28	A	05/07/86	0	0											
28	A	08/05/86	0	0											
28	A	11/05/86	0	0											
28	A	01/29/87	0	0											
28	A	04/27/87	0	0											
28	A	11/05/87	0	0									BMDL B	2 B	
28	A	02/03/88	2	0											
28	A	04/21/88	0	0											

PRELIMINARY
DATA

DATA ENTERED ______ DATE ______

DATA REVIEWED ______ DATE ______

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C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
29	C	02/22/85	0	0											
29	C	04/25/85	0	0											
29	C	06/24/85	0	0											
29	C	08/12/85	1	0										1	
29	C	11/04/85	0	0											
29	C	01/06/86	0	0							FILTERS RECHARGED · · · · ·		01/86		
29	C	03/10/86	0	0											
29	C	05/06/86	0	0											
29	C	01/28/87	0	0							FILTERS RECHARGED · · · · ·		12/86		
29	C	04/27/87	0	0											
29	C	11/05/87	0	0							FILTERS RECHARGED · · · · ·		11/87		
29	C	02/03/88	0	0											
29	C	04/20/88	BMDL	0										BMDL B	
29	B	02/22/85	3	0							1			2	
29	B	04/25/85	0	0											
29	B	06/24/85	1	0										1	
29	B	08/12/85	2	0										2	
29	B	11/04/85	0	0											
29	B	01/06/86	1	0										1	
29	B	03/10/86	0	0											
29	B	05/06/86	0	0											
29	B	01/28/87	0	0											
29	B	04/27/87	0	0											
29	B	11/05/87	0	0											
29	B	02/03/88	4	0								4 S			
29	B	04/20/88	0	0											
29	A	08/27/84	0	0											
29	A	08/12/84	1	0			1								
29	A	02/22/85	0	0											
29	A	04/25/85	0	0											
29	A	06/24/85	3	0										3	
29	A	08/12/85	0	0											
29	A	11/04/85	0	0											
29	A	01/06/86	0	0											
29	A	03/10/86	0	0											
29	A	05/06/86	0	0											
29	A	08/05/86	0	0											
29	A	11/05/86	0	0											
29	A	01/28/87	0	0											
29	A	04/27/87	0	0											
29	A	11/05/87	0	0											
29	A	02/03/88	0	0											
29	A	04/20/88	0	0											

PRELIMINARY
DATA

DATA ENTERED ____ DATE ____

DATA REVIEWED ____ DATE ____

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
30	A	08/27/84	0	0											
30	A	09/12/84	0	0											
30	A	03/13/85	0	0											
30	A	04/22/85	0	0											
30	A	06/24/85	1	0										1	
30	A	08/12/85	0	0											
30	A	11/04/85	0	0											
30	A	01/06/86	0	0											
30	A	03/10/86	0	0											
30	A	05/06/86	0	0											
30	A	08/05/86	0	0											
30	A	11/05/86	0	0											
30	A	01/28/87	0	0											
30	A	04/27/87	0	0											
30	A	11/05/87	0	0											
30	A	02/03/88	BMDL	0										BMDL B	
30	A	04/20/88	0	0											
31	C	02/22/85	2	0								2			
31	C	06/24/85	0	0											
31	C	01/06/86	5	0								5			
											FILTERS RECHARGED ·····		01/86		
31	C	05/07/86	0	0											
											FILTERS RECHARGED ·····		11/86		
31	C	01/28/87	0	0											
31	C	04/27/87	0	0											
											FILTERS RECHARGED ·····		11/87		
31	C	11/02/87	0	0											
31	C	02/03/88	1	0			BMDL B								1 S
31	C	04/21/88	BMDL	0										BMDL B	
31	B	02/22/85	2	0								2			
31	B	06/24/85	0	0											
31	B	01/06/86	0	0											
31	B	05/07/86	0	0											
31	B	01/28/87	3	0								3			
31	B	04/27/87	0	0											
31	B	11/02/87	0	0											
31	B	02/03/88	3	0			1 S								2 S
31	B	04/21/88	BMDL	0										BMDL B	
31	A	08/12/84	3	2	1										
31	A	02/22/85	4	2								2			
31	A	04/22/85	3	3											
31	A	06/24/85	0	0											
31	A	11/04/85	1	1											
31	A	01/06/86	0	0											
31	A	05/07/86	0	0											
31	A	08/05/86	2	2											
31	A	11/05/86	3	3											
31	A	01/28/87	2	2											
31	A	04/27/87	1	1 B											
31	A	11/2/87	1	1											
31	A	2/3/88	1	1											
31	A	4/21/88	2	2										BMDL B	

PRELIMINARY
DATA

DATA ENTERED
DATE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethene	Methylene chloride	2-chloro-ethylvinyl-ether
32	C	05/16/85	32	29							3				
32	C	06/24/85	14	12							2				
32	C	07/17/85	0	0											
32	C	08/12/85	0	0					FILTERS RECHARGED AND REMOVED FOR WINTER ----					01/86	
32	C	06/15/87	0	0					FILTERS RECHARGED AND REMOVED FOR WINTER ----					11/87	
32	B	05/16/85	0	0											
32	B	06/24/85	0	0											
32	B	07/17/85	0	0											
32	B	08/12/85	1	0										1	
32	B	06/15/87	0	0											
32	A	09/12/84	88	83					4			1			
32	A	09/26/84	140	137					2			1			
32	A	04/22/85	132	130					2						
32	A	05/16/85	40	40											
32	A	06/24/85	55	54					1						
32	A	07/17/85	28	26											
32	A	08/12/85	122	120					2						
32	A	08/05/86	101	100					1						
32	A	06/15/87	54	0			54								
33	A	12/04/84	7	7											
33	A	05/10/88	11	11					BMDL B					BMDL B	
34	C	12/10/85	0	0											
34	C	01/06/86	1	0										1	
34	C	03/10/86	0	0											
34	C	05/07/86	0	0											
34	C	01/28/87	0	0						FILTERS RECHARGED -----			12/86		
34	C	04/27/87	0	0											
34	C	11/05/87	0	0						FILTERS RECHARGED -----			12/87		
34	C	02/03/88	BMDL	0									BMDL B		
34	C	04/20/88	0	0											
34	B	12/10/85	0	0											
34	B	01/06/86	0	0											
34	B	03/10/86	0	0											
34	B	05/07/86	0	0											
34	B	01/28/87	0	0											
34	B	04/27/87	0	0											
34	B	11/05/87	0	0											
34	B	02/03/88	BMDL	0									BMDL B		
34	B	04/20/88	0	0											
34	A	11/04/85	4	4											
34	A	12/10/85	4	4											
34	A	01/06/86	0	0											
34	A	03/10/86	1	1											
34	A	05/07/86	2	2											
34	A	08/05/86	3	3											
34	A	11/05/86	2	2											
34	A	01/28/87	2	2											
34	A	04/27/87	2	2											
34	A	11/05/87	3	3											
34	A	02/03/88	3	3									BMDL B		
34	A	04/20/88	2	2											

PRELIMINARY
DATA
DATA ENTERED DATE

C - POST
B - MID
A - PRE

HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

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LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
35	C	03/10/86	0	0											
35	C	05/07/86	0	0											
35	C	01/29/87	0	0							FILTERS RECHARGED - - - - -		12/86		
35	C	04/27/87	0	0							FILTERS RECHARGED - - - - -		12/87		
35	C	02/03/88	BMDL	0								BMDL	BMDL B	BMDL B	
35	C	04/20/88	0	0											
35	B	03/10/86	0	0											
35	B	05/07/86	0	0	1										
35	B	01/28/87	0	0											
35	B	01/29/87	0	0											
35	B	04/27/87	0	0											
35	B	02/03/88	1	0								1		BMDL B	
35	B	04/20/88	0	0											
35	A	01/06/86	2	2											
35	A	03/10/86	0	0											
35	A	05/07/86	0	0											
35	A	08/05/86	2	2											
35	A	11/05/86	0	0											
35	A	01/29/87	2	2											
35	A	04/27/87	0	0											
35	A	02/03/88	3	2								1		BMDL B	
35	A	04/20/88	1	1											
36	A	03/10/86	0	0											
36	A	05/07/86	0	0											
36	A	08/05/86	0	0											
36	A	11/05/86	0	0											
36	A	01/28/87	0	0											
36	A	04/27/87	0	0											
36	A	11/05/87	0	0											
36	A	02/03/88	BMDL	BMDL									BMDL B		BMDL 5
36	A	04/20/88	BMDL	BMDL											
37	A	08/05/86	0	0											
38	A	05/07/86	0	0											
38	A	04/27/87	0	0											
38	A	04/20/88	0	0											
39	A	05/07/86	0	0											
39	A	04/27/87	0	0											
39	A	04/20/88	BMDL	BMDL										BMDL B	
40	A	01/29/87	0	0											
41	A	08/05/86	0	0											
41	A	01/29/87	0	0											
41	A	11/05/87	0	0											
41	A	04/27/87	0	0											
41	A	11/05/87	0	0											
41	A	02/03/88	0	0											
41	A	04/21/88	BMDL	0										BMDL B	

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEWED DATE

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HISTORICAL WQ DATA
RESIDENTIAL WELLS - VOLATILE ORGANIC RESULTS (ppb)

C - POST
B - MID
A - PRE

LOC #	TAP *	SAMPLE DATE	TOTAL VOLATILES	TCE	Benzene	Ethyl-Benzene	Tetra-chloro-ethene	Chloro-benzene	Trans-1,2-dichloro-ethene	Dibromo-chloro-methane	Chloro-form	Toluene	1,2-di-chloro-ethane	Methylene chloride	2-chloro-ethylvinyl-ether
42	A	08/05/86	0	0											
42	A	11/05/87	0	0											
43	A	08/05/86	0	0											
44	A	01/29/87	0	0											

NOTE: Blank spaces = none detected.
QUALIFIER CODES:
J - This result should be considered a quantitative estimate.
B - This result is of questionable qualitative significance since this compound was detected in blanks at similar concentrations.
S - ERM considers this result suspect - see the ERM Quality Assurance Review.
BMDL - This compound was detected at a level that is below the method detection limit.

PRELIMINARY
DATA

DATA ENTERED DATE

DATA REVIEWED DATE

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TABLE 3
MONITORING WELLS AND SURFACE WATER RESULTS

Well Number	Date Sampled	Total Volatiles	Benzene	Toluene	Ethylbenzene	Methylene Chloride	Vinyl Chloride	Carbon Tetrachloride	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane	Trans-1,2-Dichloroethene	Chloroform	Dichlorobromomethane	Trichloroethene	Tetrachloroethene	1,2-Dichloroethane	Dibromochloromethane
B-1	6/6/84	4201	1230						2	7		2800	130	30	62			
	6/6/84	4500					260					3200	630		670			
	11/13/84	3368								8		3200	100		60			
	4/23/85	467					32					600	20		27			
	7/23/85	5000		100			200					4700						
	11/7/85	8400										8400						
	2/6/86	6000										6000						
	5/6/86	8200					300					7000						
	8/5/86	3600					170					3330						
	11/4/86	6020					550					5470						
	Q 8/4/87	7000		100 (B)	100	100 (B)	600					8000						
	Q 4/18/88	7277	26	500 (B)	500		1200		7	12		6600	76		62	1		
B-5	6/6/84	330400		6800	1800								63000		200000			
	6/18/84	220300	5000	6300	800	8120			100	250	12700	10000	2100		100000			
	11/14/84	280016		8400	870	1640			60	240	7400	20700	1770		263000	1810		
	4/23/85	122000		4000							11000	9000	2000		90000			
	7/23/85	241900		4000	1000	1100				400	11000	21000	2400		200000	1000		
	11/7/85	194000		3000							8000	18000	4000		100000			
	2/6/86	120000		3000							8000	20000	1000		90000			
	5/6/86	80000		3000							7000	17000			60000	1000		
	8/5/86	169000		8000							6000	24000	1000		74000			
	11/4/86	94300		1200							6700	40000	600		46000	800		
	Q 1/28/87	87700		600						600	6300	20000			20000	1000		
	Q 4/28/87	80000		3400	600	800				800	6000	10000	1200		40000	1400		
	Q 8/4/87	71600		1040 (B)		800 (B)					6300	31000			31000	1200		
	Q 11/2/87	196300		7800	1000	2600 (B)				2000	21000	26000	4200		100000	8400		
B-9	11/14/84	188										28	1		100			
B-10	6/6/84	2400	44									66			2300			
	6/18/84	1703	31							1		100	20		1640			
	11/14/84	3884						1		8	3	66	7		2600	5		
	4/24/85	910													910			
	7/23/85	3400													3400			
	11/7/85	3170										60	10		3100			
	2/6/86	1044								1	1	62	7		1000	3		
	5/6/86	3500													2600			
	8/5/86	1100													1100			
	11/4/86	3600										66			2600			
	Q 4/28/87	1880										160			1700			
	Q 8/4/87	3300										80	30		3300			
	Q 11/2/87	2700													2700			
	Q 2/4/88	1840										40	BMDL (B)		1800			
B-11	6/6/84	1464	324									800			480			
	6/14/84	1020	288									840			620			
	11/14/84	330										510			120			
	4/24/85	3020										1000			2000			
	7/23/85	2500										1200			1300			
	11/7/85	2721							13	4	3	1600			1200	1		
	2/6/86	3637					9		13	4	8	1800			2000			
	8/5/86	4600					88					1800			3000			
	11/6/86	3370					47		10	5	3	2000			1300			
	Q 4/28/87	1432					20		7	3	8	1100			290			
	Q 8/4/87	2140					40					1100			1000			
	Q 11/4/87	2180					20					1300			620			
	Q 2/4/88	3400					70					1700			1660			
AW-1	3/27/85	0																
	5/1/85	10											1		8			
	6/12/85	3													3			
	11/7/85	8													2			
	2/6/86	4													4			
	5/6/86	9																
	8/4/86	2													2			
	11/4/86	2													2			
	Q 1/28/87	1													1			
	Q 4/28/87	4													4			
	Q 8/3/87	1													1			
	Q 11/4/87	2													2			
	Q 2/2/88	3													2			
	Q 4/21/88	2													2			
SW-1	6/14/84	16		4								12						
	11/13/84	13			1	2						3	1		8			
	4/23/85	12										5			6			

QUALIFIER CODES:
- Q - These sampling results have undergone an EPA Quality Assurance Review.
- B - This result is of questionable qualitative significance since this compound/constituent was detected in blanks at similar concentrations.
- J - This result should be considered a quantitative estimate.
- BMDL - Below method detection limit.

PRELIMINA
DATA

DATA ENTERED

DATA REVIEWED

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TABLE 3 (CONTINUED)

Well Number	Date Sampled	Total Volatiles	Benzene	Toluene	Ethylbenzene	Methylene Chloride	Vinyl Chloride	Carbon Tetrachloride	1,1-Dichloroethane	1,1-Dichloroethene	1,1,1-Trichloroethane	Trans-1,2-Dichloroethene	Chloroform	Dichlorobromomethane	Trichloroethene	Tetrachloroethene	1,2-Dichloroethane	Dibromochloromethane
MW-3	6/6/84	0																
	8/15/84	0																
	11/14/84	27										3			24			
	4/23/85	1													1			
	Q 4/16/86	19													18			
MW-4	8/8/84	0				1												
	8/14/84	0																
	11/14/84	0																
MW-5	6/8/84	3													3			
	8/14/84	0																
	11/13/84	0																
MW-6	6/8/84	0																
	8/28/84	0																
	11/13/84	1													1			
MW-7	6/7/84	185	5									2			180			
	8/14/84	274	1									3			270			
	11/13/84	140													140			
	4/24/85	300													300			
	7/23/85	140													140			
	11/7/85	70										3			67			
	2/6/86	163										3			160			
	5/6/86	284										12	2		270			
	11/4/86	60													60			
	Q 4/29/87	47										2			45			
	Q 8/4/87	9					3								6			
	Q 11/4/87	24					8					8			8			
	Q 2/3/88	17				BMDL (B)	6					BMDL			11			
MW-8	7/26/84	0																
	7/30/84	0																
	8/14/84	0																
	11/13/84	2													2			
MW-9	6/7/84	1326300		300	100	300		21000			4600				1300000			
	8/15/84	779000		700				22000				700	1300		742000	3100		
	11/13/84	605000						18000			4000		1000		480000	2000		
	4/24/85	1160000													1160000			
	7/23/85	1361400		500		1000		21000	100		4900		1400		1360000	1800		
	11/7/85	1124000						17000							1100000	7000		
	2/6/86	4160000						88000							4130000			
	5/6/86	1190000													1180000			
	8/4/86	1030000						20000							1010000			
	11/4/86	960000						20000							940000			
	Q 4/29/87	930000				20000		10000							900000			
	Q 8/4/87	1600000						170000			20000				1400000			
	Q 11/4/87	764000		300		210		10000	60		2000	60	300		740000	1300		
MW-10	11/13/84	69000						3000							80000			
	4/24/85	10050									250				16000			
	7/23/85	20000						200			700	100			27000			
	11/7/85	31200						100	200		700	160			30000			
	2/6/86	16300									300				18000			
	5/6/86	33600					600	200			600				32000			
	8/4/86	13220									220				12000			
	11/4/86	22400									400				22000			
	Q 1/29/87	10773				4 (B)		120	26	17	400	50	7		10000	43		
	Q 4/29/87	23141				5	1	100	36	26	730	110	7		22000	73		
	Q 8/4/87	22000				900 (B)									22000			
	Q 11/4/87	20400						200	30	30	1000	160			28000	60		
	Q 2/3/88	2500									BMDL				2500 J			

QUALIFIER CODES: Q - These sampling results have undergone an EPA Quality Assurance Review
B - This result is of questionable qualitative significance since this compound/constituent was detected in blanks at similar concentrations.
J - This result should be considered a quantitative estimate.
BMDL - Below method detection limit.

PRELIMINARY DATA

DATA ENTERED

TABLE 2 (CONTINUED)

Well Number	Date Sampled	Total Volatiles	Benzene	Toluene	Ethylbenzene	Methylene Chloride	Vinyl Chloride	Carbon Tetrachloride	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane	Trans-1,2-Dichloroethene	Chloroform	Dichlorobromomethane	Trichloroethene	Tetrachloroethene	1,2-Dichloroethane	Dibromochloromethane
MW-10	6/7/84	18070	2070							100	370	9000	1100	100	300			
	8/15/84	24000						1200		1200		10000	4100					
	11/13/84	84000		3900	1000				300	700	1000	42000	3600		1000			
	4/24/85	18494		320	553				76		773	16600	1030		600	45		
	7/22/85	11200								200	600	12000	1000		500			
	11/7/85	80000		7600						1000	3000	42000	6000		1000			
	2/6/86	30100		1400						600	1100	32000	3000					
	5/6/86	16400				500					600	14000	1100		400			
	8/4/86	27500		300						250	810	10000	1600		6600			
	11/4/86	65500		1800	1100					700	2700	48000	6000					
84-2	8/8/84	68													66			
	11/13/84	8		4	1													
84-3	8/14/84	62	5	7						4	6	7			20			
	11/13/84	663							3	12	11	76			600			
	4/24/85	1204									36	90			1070			
	7/22/85	2417		1					4	41	210	100			2000	1		
	11/7/85	3706								70	620	400			3000			
	2/6/86	3660									100	700			2000			
	5/6/86	4680								100	400	1000			2600			
	8/6/86	2610								60	270	700			1700			
	11/4/86	3170								50	374	613			1020			
	Q 1/20/87	3071							21	50	400	1200			2200	2		
	Q 4/20/87	4690								100	610	2120			1710			
	Q 8/3/87	8150								100	1200	2600			6000			
	Q 11/3/87	13100				260 (B)				300	3000	4000			6000			
	Q 2/3/88	17040							60	300	3400	4600			6000			
84-4	8/14/84	123	20	10	1					3		66	14		4			
	11/13/84	19	1									16	2		1			
	4/24/85	204		66	14	6	6					104			17			
	7/22/85	146		26	7	7	3					95			6			
	11/7/85	73		12		5						60			6			
	2/6/86	29		1								20						
	5/6/86	114			15	10						90	2		4			
	8/6/86	60				2						64			3			
	Q 4/20/87	109		10	15	5	4					162			3			
	Q 8/4/87	37										37						
	Q 11/3/87	30										37			1			
	Q 2/4/88	48		5	2	1 (B)						44			BMDL		BMDL (B)	
	Q 4/18/88	86		5 (B)	5	6 (B)	3					76						
84-5	8/14/84	410	30	60		10							10		270			
	11/14/84	222		5		9					1	3	7		200			
	4/24/85	6720				110						100			6620			
	7/22/85	7200				100						100			7000			
	11/7/85	2140				70						70			3000			
	2/6/86	2720		7		55			2	1		63	4		2000			
	5/6/86	9400										100			9400			
	8/6/86	6600													6600			
	11/4/86	4620				60						70			4300			
	Q 1/20/87	2110				60 (B)						40			2070			
	Q 4/28/87	4615		14	2	100			5	2		97	4		4400	1		
	Q 8/4/87	2600				20 (B)						40			1000			
	Q 11/3/87	1850				30 (B)						20			1000			
	Q 2/4/88	2952		4		40 (B)			1	BMDL		61	2		1000		BMDL (B)	
84-6	8/28/84	6																
	11/14/84	6										1			6			
	4/24/85	14													14			
	7/22/85	16													16			
	11/7/85	20										2			24			
	2/6/86	29										2			27			
	5/6/86	22										1			21			
	8/6/86	27										2			26			
	11/4/86	16										1			17			
	Q 1/20/87	25										2			27			
	Q 4/20/87	27										1			26			
	Q 8/4/87	13				1 (B)									12			
	Q 11/3/87	20										2			24			
	Q 2/4/88	26										2			24			

QUALIFIER CODES:
Q These sampling results have undergone an EPA Quality Assurance Review
B This result is of questionable qualitative significance since this compound/constituent was detected in blanks at similar concentrations
J This result should be considered a quantitative estimate
BMDL - Below method detection limit

PRELIMINA
DATA

DATA ENTERED

DATA REVIEWED

TABLE 8 (CONTINUED)

Well Number	Date Sampled	Total Volatiles	Benzene	Toluene	Ethyl-benzene	Methylene Chloride	Vinyl Chloride	Carbon Tetrachloride	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,1,1-Trichloro-ethane	Trans-1,2-Dichloro-ethene	Chloroform	Dichloro-bromo-methane	Trichloro-ethene	Tetrachloro-ethene	1,2-Dichloro-ethane	Dibromo-chloro-methane
84-7	8/14/84	66	3									8	3		55			
	11/13/84	900										20			880			
	4/24/85	479										27	42		410			
	7/23/85	430										30			400			
	11/7/85	127										30	6		90			
	2/6/86	1													1			
	5/6/86	1000										60	100		850			
	8/4/86	480										20	30		430			
	11/4/86	133										24	9		100			
	Q 4/20/87	663						6				11	10		636			
	Q 8/6/87	138										30	8		100			
	Q 11/6/87	90										40	3		47			
84-8	8/14/84	7900	100									400			7400			
	11/13/84	16727			1		31	44	20	16		400	23		16100	18	78	
	4/24/85	3884						38			30	107			3710			
	7/23/85	14400						100	30		120	200	20		14000			
	11/7/85	11300										300			11000			
	2/6/86	8300													8300			
	5/6/86	13600									100	400			13000			
	8/4/86	14300										300			14000			
	11/4/86	16900										700			16200			
	Q 4/20/87	12330						100			120	110			12000			
	Q 8/6/87	11370				60 (B)					100	100			11000			
	Q 11/6/87	10000									88.7 J	100			9900			
84-9	10/10/84	83													83			
	11/13/84	82						1							81			
	4/30/85	120													120			
	8/12/85	90													90			
	11/7/85	61													61			
	1/7/86	66													66			
	5/6/86	61													61			
	8/4/86	200													200			
	11/4/86	30													30			
	Q 4/20/87	36		8 (B)											36			
	Q 8/6/87	33													33			
	Q 11/6/87	30													30			
	Q 4/18/88	14													14			
84-10	10/10/84	6													6			
	11/14/84	10													10			
	4/30/85	1								1								
	7/22/85	3		1						1					1			
	11/7/85	13								2					11			
	1/7/86	6													6			
	5/7/86	11													11			
	8/5/86	3													3			
	11/3/86	31													31			
	Q 4/20/87	2													2			
	Q 8/3/87	0																
	Q 11/3/87	31													31			
	Q 2/2/88	22		BMDL											22 J			
	Q 4/18/88	30													30 J			
84-11	10/10/84	44						20					8		11			
	11/14/84	22						16					4		3			
	4/30/85	23						2					2		19			
	8/12/85	29											3		26			
84-12	10/10/84	6													6			
	11/13/84	5													5			
	4/30/85	4													4			
	8/12/85	6				3									6			
	11/7/85	4													4			
	1/8/86	3													3			
	5/6/86	2													2			
	8/4/86	2													2			
	11/3/86	3													3			
	Q 1/23/87	2													2			
	Q 4/23/87	2													2			
	Q 8/6/87	2													2			
	Q 11/4/87	3													3			
	Q 4/18/88	2													2			
88-13	Q 4/22/88	3		1 (B)		2 (B)												
88-16	Q 4/22/88	0																

QU[illegible] CODES: Q These sampling results have undergone an EPA Quality Assurance Review
B This result is of questionable qualitative significance since the compound/constituent was detected in blanks at similar concentrations
J This result should be considered a quantitative estimate.
BMDL - Below method detection limit

PRELIMINARY DATA

DATA ENTERED DATE

DATA REVIEWED DATE

TABLE 8 (CONTINUED)

Well Number	Date Sampled	Total Volatiles	Benzene	Toluene	Ethyl-benzene	Methylene Chloride	Vinyl Chloride	Carbon Tetrachloride	1,1-Dichloro-ethene	1,1-Dichloro-ethane	1,1,1-Trichloro-ethane	Trans-1,2-Dichloro-ethene	Chloroform	Dichloro-bromo-methane	Trichloro-ethene	Tetrachloro-ethene	1,2-Dichloro-ethane	Dibromo-chloro-methane
PW-2	6/6/84	6													6			
	8/10/84	5													5			
	11/14/84	64										3			61			
	8/14/85	6													6			
	11/7/85	33										2			31			
	2/5/86	16		1		6						2			11			
	8/4/86	45													44			
	11/4/86	27										2			25			
	Q 1/23/87	21													21			
	Q 4/29/87	32				1									31			
	Q 8/3/87	26										1			25			
	Q 11/6/87	16													10			
	Q 2/3/88	23										1			22			
	Q 4/28/88	21										1 (B)			20			
PW-3	8/16/84	6													5			
	11/14/84	21										1			20			
	4/23/85	5													5			
	11/7/85	12													12			
	1/7/86	11													11			
	2/5/86	6													6			
	5/5/86	4													4			
	8/4/86	6													6			
	11/4/86	6													5			
	Q 1/23/87	6													5			
	Q 4/29/87	5													6			
	Q 8/3/87	4													4			
	Q 11/6/87	6													5			
	Q 2/3/88	7										BMDL			7		BMDL (B)	
	Q 4/28/88	12													12			
PW-4	6/7/84	6													6			
	8/16/84	100													100			
	10/10/84	9																
	11/14/84	4													4			
	4/23/85	4													4			
	8/14/85	3													3			
	11/7/85	3													3			
	1/7/86	3													3			
	2/5/86	3													3			
	8/4/86	5													6			
	11/4/86	3													5			
	Q 1/23/87	4													4			
	Q 4/29/87	5													3			
	Q 8/3/87	4													4			
	Q 11/6/87	6													6			
	Q 2/3/88	3													3			
	Q 4/28/88	4													4			
[illegible]	8/6/84	8													8			
	8/23/85	6													6			
Drain Effluent	4/23/85	126										7			120			
	7/23/85	450										60			400			
	11/7/85	141								1	1	10			120			
	2/10/86	13													13			
	5/5/86	275									2	12			200			
	8/4/86	71						1				4			67			
	11/5/86	207										27			100			
	Q 8/3/87	434								1	1	40	2		350			
	Q 4/21/88	110									1	9			100			
Stream Samples S1	11/7/85	7										1			6			
	2/5/86	5													5			
	5/5/86	33	2	3	1							2			25			
	8/5/86	19													19			
	11/5/86	12		3								2	1		9			
	Q 1/28/87	23		1 (B)								1			21			
	Q 4/29/87	19													19			
	Q 8/3/87	12		7									2		3			
	Q 11/3/87	27										4			23			
	Q 2/3/88	12		BMDL								1	BMDL (B)		12			
	Q 4/21/88	24	3	3 (B)								2			19			

QUALIFIER CODES: Q These sampling results have undergone an EPA Quality Assurance Review
B This result is of questionable qualitative significance since the compound/constituent was detected in blanks at similar concentrations
J This result should be considered a quantitative estimate.
BMDL - Below method detection limit

PRELIMINARY DATA

DATA ENTERED

DATA REVIEWED

APPENDIX C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

RESPONSIVENESS SUMMARY FOR THE
PROPOSED REMEDIAL ACTION PLAN
AT THE BENDIX FLIGHT SYSTEMS SUPERFUND SITE
SOUTH MONTROSE, SUSQUEHANNA COUNTY
PENNSYLVANIA

September 30, 1988

I. Introduction

The Bendix Flight Systems site, located in Bridgewater Township, is an active facility involved in the manufacture of aircraft instrumentation and is currently owned by Allied Signal. Past waste handling practices conducted at approximately five areas of the plant resulted in contamination of both on-site soils and area ground water. Available information indicates that solvent wastes were dumped onto the property. An investigation of the site and sampling studies have revealed the presence of assorted volatile organic compounds. The Bendix site was placed on the Superfund National Priorities List (NPL) in June, 1986.

II. Summary of Community Relations Activities

The Bendix site was added to the Superfund National Priorities List in June, 1986. Community relations activities have been performed largely by PADER and the Bendix Corporation who have developed a close working relationship with area homeowners and businesses. Community relations activities have included public meetings to discuss site contamination and possible cleanup plans. A special slide presentation, produced by Bendix, was used for this purpose. News releases and site fact sheets were issued periodically to provide residents with information on site developments. The community relations effort has been described by PADER as a grass roots program in that residents who received bottled water and carbon filters worked closely with the Bendix contractor. There was little media interest in this site. On August 26, 1988, a public notice was placed in the Scranton Times to inform residents that the Proposed Remedial Action Plan was available for comment at the Susquehanna County Planning Commission in Montrose. This notice also offered a public meeting on the PRAP, however requests for a public meeting were never received.

III. Written Comments

The following are responses regarding comments made during the Public Comment Period in regard to the Proposed Remedial Action Plan for the Bendix site. The comments were made in a letter dated September 22, 1988 from Celeste M. Miller, Supervisor of Environmental Affairs at the Bendix South Montrose plant, to Gary Moulder. (See attached)

1. Comment: The public notice and supporting information stated that there are four remedial alternatives for dealing with the contamination of the west side but listed only five items.

Response: There are only four remedial alternatives developed for remediation of the west portion of the Bendix site. The listed Alternative #5 in the Proposed Plan was an alternative developed by EPA for comparative purposes. Information to develop this alternative can be found in the Feasability Study.

2. Comment: The support information in the Proposed Plan contained certain errors concerning costs associated with the remedial alternatives. Specifically the following:

	Cost Presented	Proposed Cost Revision
West Side Alternative #1	O&M: $0	$50,000
West Side Alternative #3	Construction: $1,580,000 O&M: $0	$953,000 $189,000
East Side Alternative #1	O&M: $0	$50,000

Response: EPA agrees with these modifications for West Side Alternative #3 **although these costs are** just estimates. The cited O&M costs for both the **East and West Sides** are typographical errors in the Proposed Plan.

3. Comment: **Allied-Signal** agrees with the selection of Alternative #2 for the West Side and Alternative #5 for the East Side as outlined in the Feasability Study as the preferred alternatives for remedial action at the Bendix Site.

Allied-Signal Aerospace Company

Allied Signal

Flight Systems Division
South Montrose, PA 18843
Telephone (717) 278-1161

September 22, 1988

Gary Moulder
PA DER
625 Cherry Street
Reading, PA 19602

Mark Carmon
PA DER
90 E. Union Street
Wilkes-Barre, PA 18701

RE: Bendix Superfund Site
South Montrose, Susquehanna County, Pennsylvania

Dear Gary:

Flight Systems Division of Allied-Signal Aerospace Company is providing the following comments to the Pennsylvania Department of Environmental Resources (PADER) and the U.S. Environmental Protection Agency as requested in the public notice for the Bendix Superfund Site.

The public notice and supporting information stated that there are four remedial alternatives for dealing with the contamination of the west side but listed five items. The fifth item listed "#5 - Excavation and Off-Site Disposal of Soil", was not an alternative provided for in the Feasibility Study. In addition, there is no data in the Feasibility Study to support the estimated costs indicated in the support information for implementing this remedial alternative.

The support information contained certain errors concerning costs associated with the remedial alternatives. Specifically, the following alternatives should be revised accordingly:

West Side

Alternative 1 - No remediation of soil contamination sources or the contaminated groundwater is undertaken. Continue to monitor the groundwater.

Estimated Construction cost:	$ 0
Estimated Annual O & M costs:	$ 50,000
Estimated Implementation Timeframe:	0 years

Alternative 3 - Vacuum extraction of soil in weathered till from the trichloroethylene (TCE) tank area to the eastern edge of parking lot, domestic and industrial well treatment by carbon adsorption.

Estimated Construction cost:	$ 953,000
Estimated Annual O & M costs:	$ 189,000
Estimated Implementation Timeframe:	Soil 2-5 years Groundwater 11-30 years

East Side

Alternative 1 - No remediation of the soil contamination sources or the contaminated groundwater is undertaken. Continue to monitor the groundwater.

Estimated Construction cost:	$ 0
Estimated Annual O & M costs:	$ 50,000
Estimated Implementation Timeframe:	0 years

Allied-Signal agrees with the selection of Alternative #2 for the West Side and Alternative #5 for the East Side as outlined in the Feasibility Study as the preferred alternative for remedial action.

Allied-Signal appreciates this opportunity to provide comments to the Pennsylvania Department of Environmental Resources and the U.S. Environmental Protection Agency on the Bendix Superfund site.

Sincerely,

Celeste M. Miller

Celeste M. Miller
Supervisor Environmental Affairs

cc: P. Tan, EPA Region III

Bendix Superfund Site Proposed Remedial Action Plan
Presented by Pennsylvania Department of Environmental Resources and the United States Environmental Protection Agency

INTRODUCTION

This proposed remedial action (Proposed Plan) plan has been prepared by the Pennsylvania Department of Environmental Resources (PADER) and the United States Environmental Protection Agency (EPA) as part of PADER and EPA's Superfund public outreach efforts. This Proposed Plan presents actions that PADER and EPA may take to respond to public concern regarding the Bendix Site in South Montrose, Pennsylvania. These actions were identified by a Remedial Investigation/Feasibility Study (RI/FS) report prepared to evaluate: 1) the extent of the contamination problem at the Site, 2) the potential risks to the public health and the environment, and 3) the steps to be taken to correct the problem.

The proposed plan begins with a brief history of the Bendix Site, followed by a summary of each of the remedial alternatives PADER and EPA have under consideration for dealing with the contamination at this Site. PADER's and EPA's rationale for recommending and, in some cases eliminating any one of these remedial alternatives is included in each of the summaries. In addition, this Proposed Plan identifies the preliminary decision on a preferred alternative and explains the rationale for the preference. EPA and PADER are seeking public comment on these remedial alternatives currently under consideration. At the conclusion of this Proposed Plan, a glossary of terms that may be unfamiliar to the general public is provided.

SITE DESCRIPTION AND HISTORY

The Bendix Flight Systems Division Plant Site (Site) is located in Bridgewater Township, Susquehanna County, Pennsylvania, adjacent to the Village of South Montrose. This plant is an active facility involved in the manufacture of aircraft instrumentation and is currently owned by Allied Signal.

Past waste handling practices conducted at least five areas of the plant (see Figure 1) resulted in contamination of both on-site soils and area groundwater. According to available information solvent wastes were dumped onto the Site. The drinking water supply for the area is exclusively private wells. Bendix has installed filters on water lines to area residents whose wells have become contaminated and continues to monitor and replace these filters according to a periodic schedule.

EVALUATION CRITERIA

With PADER oversight, Allied-Bendix conducted a Remedial Investigation/Feasibility Study (RI/FS) of the site during 1985 through Spring 1988. The RI/ FS evaluated several alternatives against the following nine evaluation criteria:

- Overall protection of human health and the environment addressing whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs addressing whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and/or provides grounds for invoking a waiver.

- Long-term effectiveness and permanence referring to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

- Reduction of toxicity, mobility or volume is the anticipated performance of the treatment technologies a remedy may employ.

- Short-term effectiveness addresses the period of time needed to achieve protection, and any adverse impacts on human health an the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs and net present worth costs.

- State Acceptance indicates whether, based on its review of the RI/FS and the Proposed Plan, the State concurs on, opposes, or has no comment on the preferred alternative at the present time.

- Community Acceptance will be assessed in the Record of Decision following a review of the public comments received on the RI/FS report and the Proposed Plan.

Alternative 5 - Excavation, soil aeration and replacement of soils from highly contaminated areas, soil vacuum extraction in moderate to low contaminated areas, groundwater recovery/treatment to prevent off-site contamination migration, treatment of off-site domestic supply wells.

Estimated Construction cost:	$1,210.000
Estimated Annual O & M cost:	231,000
Estimated Implementation timeframe:	soil 3 yrs. groundwater 20-40 yrs.

PRELIMINARY SELECTION OF REMEDIAL ALTERNATIVE

The following are brief discussions which identify the preferred alternatives for the east and west portions of the Bendix Site. The selection of these alternatives are preliminary and could change as a result of public comments and other new information.

West Site Area

The preferred alternative is alternative number 2. This alternative includes vacuum extraction, groundwater supply treatment, and groundwater recovery/treatment.

East Site Area

The preferred alternative is alternative number 5. This alternative includes vacuum extraction, soil aeration, groundwater supply treatment, and groundwater recovery/treatment.

Based on new information or public comments, EPA, in consultation with PADER, may modify the preferred alternative or select another response action presented in this Proposed Plan and RI/FS report. The public, therefore, is encouraged to review and comment on all of the alternatives identified in this Proposed Plan. The RI/FS report should be consulted for more information on these alternatives.

All alternatives for both the east and west Site areas provide complete protection, in the short-term, to the groundwater users by treatment of the water at the individual wells. Long-term effectiven[illegible] is provided by the installation of facilities to remove co[illegible]nation from the groundwater and the soils at the Site.

EPA, in consultation with PADER, has made a preliminary determination that the preferred alternatives provide the best balance of trade-offs with respect to the nine criteria. If selected, the preferred alternatives are anticipated to meet the following statutory requirements to:

- Protect human health and the environment
- Attain ARARs
- Be cost-effective
- Utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable

SUMMARIZING THE STATUTORY FINDINGS

In summary, at this time the preferred alternatives are believed to provide the best balance of trade-offs among alternatives with respect to the criteria used to evaluate remedies. Based on the information available at this time, therefore, EPA and PADER believe the preferred alternative would be protective, would attain ARARs, would be cost-effective, and would utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

NEXT STEPS

Following the conclusion of the 30-day public comment period on this Proposed Plan, a Responsiveness Summary will be prepared. The Responsiveness Summary summarizes citizens' comments on the Proposed Plan and PADER and EPA's responses to these comments. Thereafter, PADER and EPA will prepare a formal decision document that summarizes the decision process and the selected remedy. This document will include the Responsiveness Summary. Copies will be made available, for public review, in the information repository listed previously.

GLOSSARY OF TERMS

Administrative Record (AR) - A legal document that contains information on a Superfund site. The AR serves as the basis for the selection of a Superfund response action, and this record is available to the public.

ARARs - Applicable or relevant and appropriate Federal, State or other promulgated public health and environmental requirement.

Feasibility Study (FS) - The purpose of this study is to identify and screen cleanup alternatives for remedial action, and to analyze in detail the technology and costs involved with the various alternatives.

National Contingency Plan (NCP) - Contains the regulations that govern the Superfund program.

APPENDIX D

Administrative Record Index
Not included